A Fish Consumption Survey
of the
[Shoshone-Bannock Tribes] [Nez Perce Tribe]
Combination Draft Final Report

***Note: there will be a separate final report and separate appendices for each of the Tribes—in September. ***

Volume III (Appendices to Volume II, Current Fish Consumption Survey)

July 30, 2015

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1.1 Appendix A—Questionnaire[1]

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[1] This paper version of the questionnaire was used from time to time as needed. The vast majority of interviews with the questionnaire embedded in in a CAPI system (computer-assisted personal interviewing) on a tablet. See the main body of this report for a description of the CAPI system used in this survey.

LIST OF TABLES

LIST OF ACRONYMS

CDC	Center for Disease Control and Prevention
FFQ	food frequency questionnaire
NCI	National Cancer Institute

*(**NOTE:** The original Preface and Telephone Screen introductory narrative were repetitive of the main design document and, therefore, removed from this appendix.)*

1.0 TELEPHONE SCREENING

1. **"Hello, I'm calling on behalf of the** *(name of Tribe and department)* **. May I please speak with** *(name of respondent)* **?"** (Enter contact information into Table A-1; refer to Table A-2 for response entry codes)

   _____ Yes
   _____ No

   If YES and respondent is speaking or when the respondent comes to the telephone, continue to Question #2.

   If NO, probe if he/she lives there, and if so, ask "**When is the best time to reach him/her?** (Record on log) "**Okay, thank you for your time. Good bye."**

   If NO, not living there, ask "**What is the best way to reach him/her?** (Record new number on log) "**Okay, thank you for your time. Good bye."**

2. **"Hello, my name is** *(your name)* **.** Reintroduce Tribe if necessary**. We are conducting a survey to determine the fish consumption rates within our Tribe. The survey is endorsed and supported by the** *(name council / other).* **Your information, plus the information of other Tribal members, will help us protect our environment and promote the health of our Tribal members and families. You are free to not answer any of the questions. Today's survey takes about 5 minutes and we would like to include your input, if now is a good time?"**

   _____ Yes
   _____ No

   If YES, **"thank you for agreeing to participate,"** check box below and continue to Question #3.

☐ *INTERVIEWER CHECK THIS BOX IF RESPONDENT AGREES TO PARTICIPATE IN THE TELEPHONE SCREENING.*

If NO, ask "**When is a good time to call back?** (Record on log) "**Okay, thank you for your time. Good bye.**"

3. **"I'd like to ask you about what you ate yesterday. Did you eat any fish yesterday? This includes ANY amount of fish, shellfish, or seafood eaten for breakfast, lunch, dinner, or snacks, by itself or within a dish such as soup."** (Record on log)

   _____ Yes
   _____ No
   _____ Don't know / Prefer not to answer

   If YES, skip to Question #8.

   If NO or other, continue to Question #4.

4. **"Did you eat any fish in the past week (**or if not, **in the past month)?"** (Record on log)

   _____ Yes
   _____ No
   _____ Don't know / Prefer not to answer

   If YES, skip to Question #7.

   If NO or other, continue to Question #5.

5. **"Did you eat any fish in the past year?"** (Record on log)

   _____ Yes
   _____ No
   _____ Don't know / Prefer not to answer

   If YES, skip to Question #7.

   If NO or other, continue to Question #6.

6. **"Thank you. Just to be thorough, is it possible that during the past year you ate fish at a restaurant, a friend's house or another place, or someone brought fish to you?"** (Record on log)

   _____ Yes
   _____ No
   _____ Don't know / Prefer not to answer

If YES, continue to Question #7.

If NO or other, skip to Question #9.

7. **"How many days did you eat fish in the past week (or month or year –** depending on previous answers**)?"** (This information will determine applicability of the NCI Method; Record on log as number per week, month, or year)

7a. "Now considering your eating habits in general, on average how many days do you eat fish – this can be number of times each week, each month, or each year?" (Record on log as number per week, month, or year)

8. **Thank you. We are also conducting survey interviews that have been endorsed by** _____*(endorsing authority)*_____. **The information that you provide will remain strictly confidential and it will help to protect the health of our Tribe. We will conduct in-person interviews in a convenient location. Your participation is very important. If you do agree to participate, you may withdraw at any time and there would be no consequence for you. May we meet with you for the survey interview?** (Record on log)

_____ Yes
_____ No

If YES, **"Great, thank you for your willingness to participate in this important survey. Let's schedule a time and place. We have Tribal interviewers available to meet 7 days a week from 8:00 am until 7:00 pm; which day in the next two weeks is best for you?"** If don't know, schedule a call-back time to set interview. Record on log, skip to #10.

If NO, **"I understand. This survey is very important. We don't have to do it immediately, we have several months to schedule it. I'd like to call you back at a later date. We want to make sure we represent the whole Tribe."**

If ACCEPT or SOFT REFUSAL, schedule re-call and skip to #10.

If HARD REFUSAL, "**Okay, thank you for your time today. Good bye."**

9. **"Can you please tell me the main reasons why you haven't eaten fish?"** Allow respondent to answer question unaided, then state **"now I will list some other reasons people do not eat fish; please let know if any of these apply to you."** List the

following items (of those not already noted by the respondent). Check left and right columns, then continue to #10:

Contamination:

A. "Do you not eat fish because of <u>fish advisories</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

B. "Do you not eat fish because of <u>pollution</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

C. "Do you not eat fish because of <u>other environmental concerns</u> (for example, eating fish is not sustainable)?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

Fish Availability:

D. "Do you not eat fish because there is <u>not enough fish available</u> to catch?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

E. "Do you not eat fish because it is <u>hard to find fresh fish</u> and seafood"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

Access to Fishing:

F. "Do you not eat fish because of <u>limited access to fishing</u> areas?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

G. "Do you not eat fish because you <u>used to have access to a boat</u> or fishing gear, but don't anymore?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

Other Reasons:

H. "Do you not eat fish because you <u>do not like fish</u> or you prefer other foods?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

I. "Do you not eat fish because you are <u>too busy</u> to catch and/or prepare fish?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

J. "Do you not eat fish because you <u>do not know how to prepare fish</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

K. "Do you not eat fish because you <u>cannot afford it</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

L. "Do you not eat fish because of <u>allergies or other health concerns</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

M. "Do you not eat fish because you are a <u>vegetarian or vegan</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

N. "Do you not eat fish because you <u>observe religious customs</u>?"

_____ Yes _____ Answered unaided
_____ No _____ Answered by prompt

Table A-1. Telephone Screening Contact Log

Respondent Name:						**Respondent ID #:**		
Respondent Telephone Number *(strike-out incorrect numbers, record new)***:**								
Scheduled Call-Back Time for Telephone Screen *(if necessary to re-schedule):*								
When Called					**Who Contacted**		**Results (of call & questions)**	
Attempt	**Date**	**Day**	**Time**	***Circle***	**Caller Name**	**Caller ID**	**Codes**	**Notes**
1				AM PM				
2				AM PM				
3				AM PM				
4				AM PM				
5				AM PM				
6				AM PM				
7				AM PM				
8				AM PM				

9				AM PM				
When Called					**Who Contacted**		**Results**	
Attempt	**Date**	**Day**	**Time**	**AM/PM**	**Caller Name**	**Caller ID**	**Code**	**Notes**
10				AM PM				
11				AM PM				
12				AM PM				
13				AM PM				
14				AM PM				
15				AM PM				

Reported eating fish <u>yesterday</u> *(circle)*: YES / NO / No Answer

Reported eating fish during past <u>week</u> *(circle)*: YES / NO / No Answer / Not Applicable

Reported eating fish during past <u>month</u> *(circle)*: YES / NO / No Answer / Not Applicable

Reported eating fish during past <u>year</u> *(circle)*: YES / NO / No Answer / Not Applicable

Number of <u>days ate fish</u> *(enter number, circle unit)***:** _____ in past Week / Month / Year

Number of <u>days generally eat fish</u> *(enter number, circle unit)***:** _____ times per Week / Month / Year

Schedule in-person interview? *(circle, enter):* YES / NO (If NO, enter call-back time at top of form)

Date: _____ (mm/dd/yyyy) Day: _____ Time: _____ am / pm Location: _____

Table A-2. Disposition Codes for Respondent Contact

01	Completed interview
02	Mid-termination
03	Hard Refusal
04	Invalid number: out of service, disconnected, fast busy
05	No answer
06	Busy signal
07	Answering machine
08	Appointment set
09	Language barrier: non-English
10	Impairment: hearing, mental health, other
11	Deceased respondent
12	Institutionalized
13	Other (Please Specify)
14	Soft Refusal
15	Email attempt
16	Enrollment office lookup
17	Acquaintance / family lookup
18	Online lookup
19	Household visit

Note: Interviewers will be trained on how to respond to telephone inquiries (leaving a message, handling refusals, calling back, etc.)

10. Finally, for the survey, we need to note the general location where you live. The zip code we have listed for your residence is *(zip code from enrollment)***; is that correct?** (Check)

_____ Yes
_____ No

If NO, **"Can you please provide your correct RESIDENCE zip code (or if you don't know the zip code, community name)?** _____[2]

Final zip code of residence: _____

This concludes the interview. Thank you very much for your cooperation. We really appreciate your time today. That is all. Good bye."

[2] **NOTE**: Individuals may have a different zip code for mail versus residence; be sure to inquire about residence. Prior to an in-person interview, the supervisor will need to check that the corrected zip code (or community name) supplied by the respondent is included in the list of eligible zip codes. If the reported residence zip code is not eligible, but the enrollment zip code used to locate the respondent is eligible, then a call-back may be made to clarify the location of the current residence address. An interview can still be scheduled pending the final determination. The final residence zip code for the respondent should be noted here.

2.0 INTERVIEW INTRODUCTION

Basic information about the interview (e.g., location) will be recorded by the interviewer prior to the in-person interview. The interviewer will then provide a brief introduction to the respondent about the project. Words to be spoken by the interviewer are identified in bold. Answers are written, checked, and/or circled, as indicated.

2.1 Administrative Information

General administrative information will be completed by the interviewer at the time of the interview, but prior to questioning the respondent.

2.1.1 Interviewer Identification

1. Interviewer Name _____
2. Interviewer ID: _____

2.1.2 Respondent Identification

3. Respondent ID: _____

2.1.3 Interview Date, Time, and Location

4. Date: ____/____/____ (mm/dd/yyyy)
5. Day (of the week): _____
6. Start time: _____ AM / PM *(circle)*
7. City, State: _____
8. Location/Venue (check):
   _____ Home _____ Central Location
   _____ Tribal Office _____ Other (coffee shop, etc.)

2.2 Introduction to Interview

To begin the in-person interview, the interviewer will introduce the purpose of the survey and provide a brief overview of its structure.

"Hello, my name is _____, and we're conducting a survey on behalf of the _____. We appreciate your willingness to participate in our fish consumption survey. The survey is endorsed by the _____.

The information you provide as part of this survey will help us understand the rates of fish consumption, how fish is prepared, and the species or types of fish regularly eaten by members of the _____ Tribe. Your information, plus the information of other Tribal members, will help us protect our environment and promote the health of our Tribal members and families.

We do not intend to collect ANY culturally-sensitive information during this interview. The information that you provide during this interview is confidential. Your responses to the questions will be combined with those of others so that your answers cannot be identified. In the meantime, if you have any questions, here is an information and contact sheet for you to keep. (Provide Information Sheet)

This interview will take about an hour. The questionnaire has 3 parts. In the first part, I will ask you to tell me how much fish you ate yesterday. The second part focuses on the past 12 months: the types of fish you ate, how often you ate it, where you got it, and how it was prepared, as well as fishing activities and special events. Finally, in the third part, I will ask you for some general information about yourself.

Your participation in this study is voluntary and you may withdraw at any time without any consequence to you. If at any time during the interview, you do not know an answer or do not feel comfortable answering a question, we can skip to the next question. You are free to not answer any of the questions. May we start the interview now?"

☐ *INTERVIEWER CHECK THIS BOX IF RESPONDENT AGREES TO PARTICIPATE IN THE IN-PERSON INTERVIEW.*

3.0 24-HOUR DIETARY RECALL

The first part of the in-person interview is a 24-hour dietary recall. Words to be spoken by the interviewer are identified in bold. Each question will be asked in numeric order. Photographic and portion model displays will be available for use during questioning.

3.1 Fish Consumption

9. **"The first questions are about your fish consumption yesterday. Please consider what you ate yesterday. I am going to ask you about EACH time you ate. That would include meals, snacks, eating at home, eating at a friend's or relative's house or a purchase somewhere. It includes eating fish anywhere or at any time and in any amount. Did you eat any fish yesterday?"**

   _____ Yes

   _____ No

   _____ Don't know / Prefer not to answer

   If YES, continue to next Question #9a
   If NO or other, skip to next Section (4.0).

9a. "**Please think about the first time you ate yesterday Please enter a description (name, time, or number) for the first occasion where you ate fish yesterday (which includes finfish, shellfish, and seafood). Consider all meals and snacks, including fish within dishes such as soups. Include fish bought from a store, from a restaurant, or caught by you or someone else."** (Enter description or occasion number in Table A-3)

10. **"What type of fish did you eat?"** (Refer to species display, if needed, enter species type in Table A-3; see Table A-4 for list of species).

10a. **"How much of the** *(species type mentioned)* **did you eat?** (See quantity displays according to species type; enter portion size according to Table A-3a).

10b. **"How was the** *(species type mentioned)* **prepared or cooked?** (Unprompted, check box in Table A-3).

10c. **"Where did the** *(species type mentioned)* **come from? Was it from a market or store? Was it from a restaurant? Or was it caught by you or someone else (this includes Tribal distributions)?**

10d. **"Was it from Idaho waters or outside of Idaho?"** (Check box in Table A-3).

10e. "**Did you eat this species prepared in any other way or did you eat any other species of fish for** *(eating occasion mentioned) ?"*

Repeat Question #9a for first/second/third species type or preparation method mentioned for that eating occasion and complete Table A-3.

_____ Yes

_____ No

If YES, repeat Question #10b above.
If NO, continue to next Question #11.

11. "**Please think about the NEXT time you ate yesterday; when was that (name the eating occasion)? Did you eat fish?** (Check)

_____ Yes

_____ No

_____ Did not eat fish rest of day

If YES, repeat Question #9a above for up to 6 eating occasions.
If NO, repeat Question #11 for all eating occasions yesterday.
If "Did not eat fish rest of day," skip ahead to next section, Question #12.

Table A-3. 24-Hr Recall: Types, Quantities, Methods, and Sources of Fish Eaten Yesterday

Occasion # & Description[1]		Species Type[2]	Portion Size / Quantity *See Displays (enter display #)*	Preparation / Cooking Method *Check box*	Source *Check box*
1		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐	☐ Market / Store ☐ Restaurant ☐ Caught ---

			Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ In Idaho ☐ Outside of Idaho
2		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
3		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other,	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

			Soup bowls: _____ cups Shellfish (organisms): _____	Unknown ☐ Casserole, Mixed Dish	
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
4		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐	☐ Market / Store ☐ Restaurant ☐ Caught ---

			Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
5		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
6		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other,	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

			Soup bowls: _____ cups Shellfish (organisms): _____	Unknown ☐ Casserole, Mixed Dish	
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

1. "Description" refers to a distinct fish-eating occasion defined by the respondent (breakfast, lunch, dinner, snack, or a time or number).
2. See Table A-4 for species list; will be coded later as anadromous, freshwater resident, or marine fish and shellfish.

Table A-3a. Portion Size Model Displays: Description and Use

Display Type[1]	Display Numbers[2]	Display Description	What Display Represents	How Respondents Report Portion Size	Associated Mass of Real Fish
Salmon	S1 to S9	Large rubber salmon fillet, cut into 24 servings	Cooked salmon and other fish species with thick fillets	Identify multiples and/or fractions for sections 1 to 24 in 0.25 increments	Serving sections range from 1.5 oz. (42 g) to 6.8 oz. (192 g) of uncooked fish
Trout	T1 to T9	Small plastic trout fillet, single serving	Cooked trout and other fish species with thin fillets	Identify multiples and/or fractions of the fillet in 0.25 increments	One fillet is 3.0 oz. (85 g) of baked fish, or 4.0 oz. (113 g) of uncooked fish
Lamprey	L1 to L9	Gray PVC pipe, 2" diameter, 14" long, notched every 2" for 7 servings	Cooked adult lamprey (eel)	Identify multiples and/or fractions of the 2" servings in 0.25 increments	Each 2" serving is calculated to be 4.0 ounces (113 grams) of uncooked fish
Jerky	J1 to J9	Package of real "salmon candy" (dried fish pieces)	Dried pieces of salmon and other fish species	Identify multiples and/or fractions of the package in 0.25 increments	Packages range from 2.4 oz. (68 g) to 3.0 oz. (84 g) of dried fish, or 5.6 oz. (159 g) to 6.5 oz. (187 g) raw fish
Bowls	B1 to B9 (each is set of 5)	Empty plastic bowls (¼, ½, 1, 1½, and 2 cups) of different colors	Containers to hold fish soup, composite dishes	Identify multiples and/or fractions of a cup in 0.25 increments	1 cup of fish soup is estimated to include 0.25 cup of cooked fish (2 oz. or 57 g) or 2.5 oz. (72 g) raw fish
Crayfish	C1 to C9	Color photograph (laminated) of whole crayfish	Cooked crayfish	Identify number of organisms	1 crayfish contains 0.26 oz. (7.2 g) of uncooked edible meat
Mussels	M1 to M9	Color photograph (laminated) of plate with 6 half-shell mussels	Cooked mussels and other bivalve shellfish	Identify number of organisms	1 mussel contains 0.4 oz. (10 g) of uncooked edible tissue
Shrimp	S1 to S9	Color photograph (laminated) of plate with 6 shrimp	Cooked shrimp	Identify number of organisms	1 shrimp contains 1.6 oz. (44 g) of uncooked edible tissue

Other	N/A	Can or jar of fish (no display provided)	Fish (tuna, salmon) in a can or jar	Identify multiples and/or fractions of cans or jars in 0.25 increments	Standard tuna can is 5 oz. (142 g); mason jar is 8 oz (227 g)

Notes

1. A total of nine identical copies of each model display type will be available for use during interviews (five for NPT and four for SBT).
2. Display numbers are written in permanent marker on every model display, as well as contact information for Kristin Callahan, RIDOLFI, 206-436-2774, in the event there are questions or need for replacements.

" = inches
g = grams
oz. = ounces

3.2 Other Dietary Information

"Now I will ask you general questions about your diet."

12. "**Was the amount of fish you ate yesterday more, less, or about the same as usual?"** (Check)

    _____ More than usual

    _____ Less than usual

    _____ About the same as usual

13. "**Are you currently on any kind of diet, either to lose weight or for some other reason?"** (Check)

    _____ Yes

    _____ No

    _____ Prefer not to answer

4.0 FOOD FREQUENCY QUESTIONNAIRE

The second part of the in-person interview is a food frequency questionnaire (FFQ) based on the past year (12 months), and includes questions on dietary patterns and related activities that may affect fish consumption.

4.1 Fish Consumption

"Thank you for the information about fish you may have eaten yesterday. The next questions are about your fish consumption (and activities involving fish) over the past year."

4.1.1 Species, Frequency, Quantities

14. "**Did you eat fish in the past 12 months? That includes finfish, shellfish, and seafood. Consider all meals and snacks, including fish within dishes such as soups. Include fish bought from a store, from a restaurant, or caught by you or someone else. Did you eat fish in the past 12 months?"** (Check)

    _____ Yes

    _____ No

    If YES, continue to Question #15.
    If NO, ask **"Please consider ANY amount of fish you may have eaten in the past year."** If still NO, terminate interview (skip to Section 5.2, Interview End).

15. "**Please tell me which types of fish you ate in the past 12 months (including the fillet and any parts). For each fish type you say you have eaten, I will ask you how often you ate it and how much you usually ate. You will be able to respond according to two periods: when the fish is in-season and the rest of the year. Remember to consider breakfast, lunch, dinner, and snacks, and include fillets, stews, and other dishes. Do NOT include special events, such as feasts and ceremonies; I will ask about that later."**

    Substitute each species name listed in Table A-4 for each of the questions below, and complete the table accordingly. Be prepared to show species photographs, if necessary, and portion size displays. Ask all questions for each species one-by-one, and record frequency according to "in season" and the rest of the year and record portion sizes according to Table A-3a.

16. "**In the past 12 months, did you eat** _____*(Species X)*___**?"**

If YES, check box in Table A-4 and continue to Question #17.
If NO, repeat question for next species on list.

17. "**Did you eat about the same amount of** *(Species X)* **throughout the year or did you eat more during certain periods and less during other periods of the year?"**

    If SAME, ask Questions #18-19 and complete Table A-4 for one period; enter length of period as 12 months. If contradiction occurs (e.g., reports only 3 months), ask "**what about the rest of the year?"** (and consider as NOT SAME below).

    If NOT SAME, skip to Question #20 and complete Table A-4 for both high and low fish-eating periods.

18. "**In the past 12 months, how often did you eat** *(Species X)* **in any form (e.g. cooked or smoked fillets, dried, or soups)?"** Enter value and check the units (number of portions per day, per week, per month, or per year).

19. **Please tell me what your typical portion size was when you ate** (*Species X)***. You may only choose ONE type of measurement, either enter the section numbers or one of the measurements below."** Refer to portion displays.

    REPEAT Question #16 for each species type listed on Table A-4.

20. "**In the past 12 months, how often did you eat** *(Species X)* **in any form (e.g. cooked or smoked fillets, dried, or soups) when it was in season?"** Enter value and check the units (number of portions per day, per week, per month, or per year).

21. **Please tell me what your typical portion size was when you ate** *(Species X)* **when it was in season. You may only choose ONE type of measurement, either enter the section numbers or one of the measurements below."** Refer to portion displays.

22. "**Recognizing that past years may be different, how long was** *(Species X)* **in season (total in weeks or months)?**" Enter value in weeks or months.

23. "**In the past 12 months, how often did you eat** *(Species X)* **in any form (e.g. cooked or smoked fillets, dried, or soups) during the rest of the year ?** Enter value and check the units (number of portions per day, per week, per month, or per year).

24. **Please tell me what your typical portion size was when you ate** *(Species X)* **during the rest of the year. You may only choose ONE type of measurement, either enter the section numbers or one of the measurements below"** Refer to portion displays.

25. REPEAT Question #16 for each species type listed on Table A-4.

26. **"Are there any other fish or shellfish species that you ate in the past 12 months that we have not mentioned here?**"
    REPEAT this question and Question #17 (series of questions).

Respondent ID: _____

Table A-4. FFQ: Types, Frequency, and Quantity of Species Eaten in Past 12 Months

Fish Species[1]	Check if eaten	Consumption When Fish are In Season[2] Or Same Consumption Year Round				Consumption Rest of the Year (Blank if Same Consumption Year Round)			
		Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)[3]	Length of period (weeks or months)	Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)[3]	Length of period (auto-calculated)
SALMON AND STEELHEAD									
Chinook (King) Salmon			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Coho (Silver) Salmon			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Sockeye (Red) Salmon			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Kokanee (resident form of sockeye)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Steelhead (migratory form of rainbow trout)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Other salmon species (specify, e.g., Chum, Pink, Atlantic salmon)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
All salmon and steelhead / species not identified			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
RESIDENT TROUT									
Rainbow Trout			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Cutthroat Trout			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Cutbow Trout (hybrid of Rainbow and Cutthroat Trout)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Bull Trout (Dolly Varden)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Brook Trout			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Lake Trout			Da Wk Mo Yr.		Wk. Mo.		Da Wk Mo Yr		Wk. Mo.

			y . .				y . . .		
Brown Trout			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Other trout species (specify)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
All resident trout / species not identified			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Fish Species[1]	**Check if eaten**	**Consumption When Fish are In Season[2] Or Same Consumption Year Round**				**Consumption Rest of the Year (Blank if Same Consumption Year Round)**			
		Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)[3]	Length of period (weeks or months)	Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)[3]	Length of period (auto-calculated)
OTHER FRESHWATER FISH AND SHELLFISH									
Sturgeon			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Lamprey			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Whitefish			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Sucker			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Burbot			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Northern Pikeminnow (Squawfish)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Bass			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Bluegill			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Carp			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Catfish			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Crappie			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.

Sunfish			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Tilapia			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Walleye			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Yellow Perch			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Other freshwater finfish (specify)			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Crayfish			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Freshwater Clams or Mussels			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.
Unspecified freshwater fish			Day	Wk.	Mo.	Yr.		Wk. Mo.		Day	Wk.	Mo. Yr.		Wk. Mo.

Respondent ID: _____

Fish Species[1]	Check if eaten	Consumption When Fish are In Season[2] Or Same Consumption Year Round				Consumption Rest of the Year (Blank if Same Consumption Year Round)			
		Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)[3]	Length of period (weeks or months)	Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #))[3]	Length of period (auto-calculated)
SEAFOOD / MARINE FISH AND SHELLFISH									
Cod			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Halibut			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Pollock			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Tuna			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Lobster			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Crab			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Marine Clams or Mussels			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Shrimp			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Other marine fish or shellfish (Specify)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Other marine fish or shellfish (Specify)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
Other marine fish or shellfish (Specify)			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.
UNSPECIFIED FISH OR SHELLFISH SPECIES			Day Wk. Mo. Yr.		Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.

Notes

1. Species are listed and grouped according to the most commonly eaten types of fish and shellfish.
2. Fish consumption "in season" is based on respondents perception or experience related to harvest and assumed higher consumption (compared to the rest of the year); biological seasons (e.g., fish runs) will be evaluated during data analysis and do not have to correspond to the duration of seasons noted by the respondent.

3. See 24-hour dietary recall (Table A-3) for examples of portion size data to enter according to species type (e.g., salmon, trout, lamprey, shellfish) or preparation method (jerky, bowls of soup). A description of the portion displays is provided in Table A-3a above.

4.1.2 Parts of Fish Consumed, Preparation Methods, and Sources

The next questions are about the parts of fish you eat, methods of preparation, and sources (where acquired) according to species groups. Those groups are 1) salmon and steelhead, 2) trout species, 3) sturgeon, and 4) suckers and whitefish." Complete Table A-5 for the following questions.

27. "**When you eat a fish fillet, what percent of the time do you eat the following species of fish with skin?"**

    ASK question for 1) salmon and steelhead, 2) trout, 3) sturgeon, and 4) suckers and whitefish. Record answers in percent (including zero) or leave blank if that species type is not consumed at all. Complete Table A-5.

28. "**When you eat** *(species group)* **, what percent of the time do you eat the eggs and what percent of the time do you eat other organs (including head and bones)?"**

    ASK question for 1) salmon and steelhead, 2) trout, 3) sturgeon, and 4) suckers and whitefish. Record answers in percent (including zero) or select "Not Applicable" if that species type is not consumed at all. Complete Table A-5.

29. **"Thinking about how the fish that you eat is prepared, what percent of the time that you eat** *(species group)* **is it: baked or broiled? smoked? dried? in a soup? or other method (specify)? Your answers should total 100%."**

    ASK question for 1) salmon and steelhead, 2) trout, 3) sturgeon, and 4) suckers and whitefish. Complete Table A-5.

30. "**Thinking about where the fish comes from that you eat, what percent of the time do you get** *(species type)* **from the following sources? Your answers should total 100%.**"
    - **Bought from a store (grocery or market)?**
    - **From a restaurant?**
    - **Caught by you or someone else in Idaho waters, including Tribal distributions?**
    - **Caught by you or someone else outside of Idaho waters, including Tribal distributions?**

    ASK question for 1) salmon and steelhead, 2) trout, 3) sturgeon, and 4) suckers and whitefish. Complete Table A-5.

Table A-5. FFQ: Fish Parts Eaten, Preparation Methods, and Sources

Species Group:	Salmon and Steelhead	Trout	Sturgeon	Suckers and Whitefish
Percent of Time Typically Eat:				
Skin				
Eggs				
Head, bone, and/or organs				
Percent of Time Typically Prepare (total 100%):				
Baked or broiled				
Smoked				
Dried				
In a soup				
Other:				
Don't know				
Percent of Time Typically Obtained (total 100%):				
Bought from a store (grocery or market)				
From a restaurant				
Caught by you or someone else (in Idaho waters)				
Caught by you or someone else (outside of Idaho)				
Other:				
Don't know				

4.2 Special Events and Gatherings

"I will now ask questions related to your fish consumption during special events and gatherings, including ceremonies or other community events." Complete Table A-6 for the following questions.

31. **"In the past 12 months, how many special events and gatherings did you attend (either per week, month or year)?**" (Enter number and circle one unit)
    _____ Events per Week / Month / Year

    If zero, skip to next section (4.3), Question #35.

32. "**Did you eat fish in any form (e.g. cooked or smoked fillets, dried, or soups) at these special events and gatherings, such as 1) salmon and steelhead, 2) trout, 3) sturgeon, 4) suckers or whitefish?"** (Circle answer in Table A-6)

    _____ Yes

    _____ No

    _____ Don't know / Prefer not to answer

    If YES continue to next question
    If NO or other, skip to next section (4.3), Question #35.

33. **"What was your typical portion size for the following species at the special events and gatherings? You may only choose ONE type of measurement, either enter the section numbers or one of the measurements below."**

    ASK question for 1) salmon and steelhead, 2) trout, 3) sturgeon, and 4) suckers and whitefish. Complete Table A-6. (See portion models.)

34. "**At what percent of the special events and gatherings did you eat** *(species group)* **?**"

    ASK question for 1) salmon and steelhead, 2) trout, 3) sturgeon, and 4) suckers and whitefish. Complete Table A-6.

Table A-6. FFQ: Fish Consumption at Gatherings

Species Group	**Consumed** (circle)	**Typical Portion Size** *(enter sections, fillets, packages, cups– see Table A-4a for model list)*	**Percent of time eat fish at gatherings**
Salmon and Steelhead	YES NO		%
Trout	YES NO		%
Sturgeon	YES NO		%
Suckers and Whitefish	YES NO		%

4.3 Fishing Activities

"I am now going to ask you some questions about fishing."

35. "**Over the past 12 months, did you take part in any fishing-related activities?**" (Check)

_____ Yes

_____ No

_____ Prefer not to answer

If YES, continue to next question.

35a. If NO, ask **"Why not"**? (Check and skip to next section)
If prefer not to answer, skip to next section.

_____ Fish advisories

_____ Pollution

_____ Other environmental concerns

_____ Not enough fish available to catch

_____ Limited access to fishing areas

_____ Used to access to boat/fishing gear, not anymore

_____ Too far from fishing areas

_____ Too busy, no time

_____ No longer custom, prefer other activities

_____ Prefer other foods

_____ Don't know how to fish

_____ Prefer not to answer

_____ Other _____

36. "**Now I'm going to ask you the approximate number of times you went fishing (for fish and shellfish) each month. How many times did you go fishing during each of the following months?"** (List and enter value for each)

_____ Times in January
_____ Times in February
_____ Times in March
_____ Times in April
_____ Times in May
_____ Times in June
_____ Times in July
_____ Times in August
_____ Times in September
_____ Times in October

_____ Times in November
_____ Times in December

37. "**What percent of the fish that you harvest do you keep for you and your household, what percent do you give/distribute to others outside your household, and what percent do you sell (your answers should total 100%)?**" (Enter)

_____ Percent Keep
_____ Percent Give to others
_____ Percent Sell
100% Total

38. "**Do you own or have access to fishing gear?**" (Check)

_____ Yes
_____ No
_____ Prefer not to answer

39. "**Do you own or have access to a boat?**" (Check)

_____ Yes
_____ No
_____ Prefer not to answer

4.4 Changes in Fish Consumption

"I am now going to ask you questions about changes in fish consumption and availability. Some of these may be open-ended questions. We do not intend to collect ANY culturally-sensitive information."

40. "**Has there been a change over time in your fish consumption?**" (Check)

_____ Yes
_____ No
_____ Don't know / Prefer not to answer

If YES, continue to next question.
If NO or other, skip to Question #41.

40a. "**How has it changed most recently?"** (Check)

_____ Increased consumption

_____ Decreased consumption

_____ Other change (e.g., available species)_____

40b. "**When did it change?"**

_____ Within past 5 years

_____ In the 2000s (or 5 to 15 years ago)

_____ In the 1990s (or 15 to 25 years ago)

_____ In the 1980s (or 25 to 35 years ago)

_____ In the 1970s (or 35-45 years ago)

_____ In the 1960s or earlier (more than 45 years ago)

40c. "**Why did it change?"** (Multiple choice options may be developed in Pilot Test)

_____

_____

41. "**In the past, how important was fish to your Tribe's heritage and culture?**"

_____ Very important

_____ Somewhat important

_____ Not important

_____ Don't know / Prefer not to answer

41a. "**Currently, how important is fish to your Tribe's heritage and culture?**"

_____ Very important

_____ Somewhat important

_____ Not important

_____ Don't know / Prefer not to answer /

42. "**Has there been a change in access to fish and fishing (for you or others) over time?**" (Check)

_____ Yes

_____ No

_____ Don't know / Prefer not to answer /

If YES, continue to next question.
If NO or other, skip to Question #43.

42a. "**How has it changed?"** (Check)

_____ More access to fishing

_____ Less access to fishing

_____ Other change_____

42b. "**When did it change?"**

_____ Within past 5 years

_____ In the 2000s (or 5 to 15 years ago)

_____ In the 1990s (or 15 to 25 years ago)

_____ In the 1980s (or 25 to 35 years ago)

_____ In the 1970s (or 35-45 years ago)

_____ In the 1960s or earlier (more than 45 years ago)

42c. "**Why did it change?"** (Multiple choice options may be developed in Pilot Test)

_____

_____

43. "**Has there been a change in how often you fish (for you or others)?**" (Check)

_____ Yes

_____ No

_____ Don't know / Prefer not to answer

If YES, continue to next question.
If NO or other, skip to Question #44.

43a. "**How has it changed most recently?"** (Check)

_____ Increased frequency

_____ Decreased frequency

_____ Other change _____

43b. "**When did it change?"**

_____ Within past 5 years

_____ In the 2000s (or 5 to 15 years ago)

_____ In the 1990s (or 15 to 25 years ago)

_____ In the 1980s (or 25 to 35 years ago)

_____ In the 1970s (or 35-45 years ago)

_____ In the 1960s or earlier (more than 45 years ago)

43c. "**Why did it change?"** (Multiple choice options may be developed in Pilot Test)

_____

_____

44. "**Has there been a change in the way you prepare or use fish?**" (Check)

_____ Yes

_____ No

_____ Don't know / Prefer not to answer /

If YES, continue to next question.
If NO or other, skip to Question #45.

44a. "**How has it changed most recently?"**

_____ Different cooking method

_____ Different use

_____ Don't know / Prefer not to answer /

44b. "**When did it change?"**

_____ Within past 5 years

_____ In the 2000s (or 5 to 15 years ago)

_____ In the 1990s (or 15 to 25 years ago)

_____ In the 1980s (or 25 to 35 years ago)

_____ In the 1970s (or 35-45 years ago)

_____ In the 1960s or earlier (more than 45 years ago)

44c. "**Why did it change?"** (Multiple choice options may be developed in Pilot Test)

_____

_____

45. "**Compared to your fish consumption now, how much/how frequently would you like to consume fish in the future?**" (Check)

_____ Increase consumption

_____ Decrease consumption

_____ Maintain same consumption

_____ Don't know / Prefer not to answer

If INCREASED, continue to next question.
If DECREASED or other, skip to next section.

46. "**If you prefer to eat more fish or seafood than you're currently eating, what would have to occur for you to eat that amount in the future?**"

_____

_____

_____

_____

5.0 GENERAL INFORMATION

The third and final part of the in-person interview involves collecting general information from the respondent and recording final administrative data.

5.1 Respondent Information

Respondents will be asked demographic questions as well as (for female respondents) questions related to breastfeeding history.

5.1.1 Demographic Information

"This is the final part of the interview. I have a few general questions and then we will be done. These include reporting your height and weight, which will help us to calculate and check fish consumption rates, and reporting education and income ranges, which will help us determine fish consumption rates for various population groups." (Check or enter – if respondent prefers not to say, enter 999)

47. Gender (check):

    _____ Male

    _____ Female

48. **"What is your age?"** _____ (years)

49. **"What is your height?"** _____ feet _____ inches

50. **"How much do you weigh?"** _____ pounds

51. "**How many people live in your household, including yourself?**" _____

52. "**Do you live on your Tribe's Reservation?**" (Check)

    _____ Yes

    _____ No

    _____ Prefer not to answer

53. "**What is the highest level of education that you've completed?**" (Check)

_____ Elementary School
_____ Middle School
_____ High School / GED
_____ Associates Degree
_____ Bachelor's Degree
_____ Master's Degree
_____ Doctorate
_____ Prefer not to answer

54. "**What is your approximate household income per year?**" (List all options below, except "prefer not to say" and check)

_____ $15,000 or less
_____ More than $15,000 up to $25,000
_____ More than $25,000 up to $35,000
_____ More than $35,000 up to $45,000
_____ More than $45,000 up to $55,000
_____ More than $55,000 up to $65,000
_____ More than $65,000
_____ Prefer not to answer

5.1.2 Breastfeeding History

The following questions are for female respondents only; if male, skip to next section.

55. "**Have you ever given birth?** (Check)

_____ Yes
_____ No
_____ Prefer not to answer

If YES, continue to next question.
Otherwise, skip to next section.

56. "**When did you most recently give birth?** _____/_____ (MM, YYYY)

57. "**Was this baby ever breastfed or fed breast milk**? (Check)

_____ Yes

_____ No

_____ Prefer not to answer

If YES, continue to next question.
Otherwise, skip to next section.

58. "**If the youngest child is no longer breastfeeding, at what age did you stop feeding breast milk to this child?"** (Provide in months or check other option)

_____ Stopped at _____ (months old)

_____ Still breastfeeding

_____ Prefer not to answer

_____ Not applicable (not biological mother, etc.)

5.2 Interview End

Upon completing the interview, the interviewer will offer appreciation and complete the remaining administrative information, including signing a form verifying participation.

"This concludes the interview. If any of your answers included culturally-sensitive information, please tell me.

_____ Yes, included culturally sensitive information

_____ No culturally sensitive information included

_____ Don't know / Prefer not to answer

If YES, this questionnaire will be reviewed by a Tribal official and culturally sensitive information may be edited or redacted prior to further analysis and review.

Thank you SO very much for your time and cooperation today. Your participation will contribute significantly to the overall success of this survey and help protect the health of our Tribe. It would also benefit the survey if you could participate in a second, follow-up interview over the phone in the next one to four weeks. This second interview will be much shorter and should only take about 15 minutes."

59. **"Is it okay if I contact you again for a follow-up call?**"

_____ Yes

_____ No

59a. If YES, "**what is the best phone number to reach you?**" _____

59b. If YES, "**Thank you. I am going to leave photographs of the portion display models with you so that you will have them for reference when I call.**" Leave actual-size photographs of models with the respondent.

59c. If NO, remind respondent of the importance of this study and ask again.

60. "**Thank you again for your time today, that is all**." Complete information below.

Record interview end time and calculate interview length.

61. End time: _____ AM / PM (circle)

62. Length of interview: _____ (hours and/or minutes)

63. Was the interview conducted in private or were others present? (Check)

_____ In private

_____ Others were present

5.3 Post-Interview

Following the interview, the interviewer will assess and record the respondent's level of participation and the interviewer will acknowledge that he/she recorded the information truthfully and to the best of his/her ability by signing the following guarantee of authenticity.

5.3.1 Interview Quality

64. Respondents cooperation: (Check)

_____ Very good

_____ Good

_____ Fair

_____ Poor

65. Respondent's reliability: (Check)

_____ Highly reliable

_____ Generally reliable

_____ Questionable

_____ Unreliable

Notes / Reasons for opinions:

_____

_____

_____

66. Note any topics or specific questions that appeared confusing or particularly challenging for the respondent to answer.

_____
_____
_____
_____
_____
_____

5.3.2 Interviewer Guarantee of Authenticity

67. I, _____ (printed name of interviewer) hereby affirm that the answers recorded on this questionnaire reflect a complete and accurate accounting of my interview with the respondent.

_____
Signature of Interviewer

_____
Date

6.0 SECOND 24-HOUR DIETARY RECALL

Based on the results of the first interview, which includes a 24-hour dietary recall, food frequency questionnaire, and general demographic information, a subset of individuals will be selected as "high" fish consumers for participation in a second 24-hour dietary recall by telephone. Words to be spoken by the interviewer are identified in bold. Questions will be asked in numeric order.

6.1 Administrative Information

Since this telephone interview will be conducted at a later date, general administrative information will be completed similar to the first interview (prior to questioning the respondent).

6.1.1 Interviewer Identification

1. Interviewer Name _____
2. Interviewer ID: _____

6.1.2 Respondent Identification

3. Respondent ID: _____
4. Phone number: _____

6.1.3 Interview Date, Time, and Location

5. Date: ____/____/____ (MM/DD/YYYY)
6. Day (of the week): _____
7. Start time: _____ AM / PM (circle)
8. City, State: _____

6.2 Introduction

Respondent ID: _____

"Hello, my name is _____, and I am calling on behalf of the _____ Tribe. We appreciate your continued willingness to participate in our fish consumption survey.

The information you provide during this follow-up interview, as well as your previous answers, plus the information of other Tribal members, will help us understand the rates of fish consumption, how fish is prepared, and the species or types of fish regularly eaten by members of the _____ Tribe.

The information that you provide during this interview is confidential. Your responses to the questions will be combined with those of others so that your answers cannot be identified. If you have any questions, please refer to the information sheet I gave you previously.

This follow-up survey is much shorter and should only take about 15 minutes. I will ask you to tell me how much fish you ate in the last 24 hours. Please refer to the photographs I left with you previously. If you do not know an answer or do not feel comfortable answering, we can skip that question. You are free to not answer any of the questions. May we start the interview now?"

☐ *INTERVIEWER CHECK THIS BOX IF RESPONDENT AGREES TO PARTICIPATE IN THE FOLLOW-UP TELEPHONE INTERVIEW.*

6.3 Fish Consumption

9. **"The first questions are about your fish consumption yesterday. Please consider what you ate yesterday. I am going to ask you about EACH time you ate. That would include meals, snacks, eating at home, eating at a friend's or relative's house or a purchase somewhere. It includes eating fish anywhere or at any time and in any amount. Did you eat any fish yesterday?"**

   _____ Yes

   _____ No

   _____ Don't know / Prefer not to answer

   If YES, continue to next Question #9a
   If NO or Other, skip to next Section (6.5), Question #14.

9a. "**Please think about the first time you ate yesterday Please enter a description (name, time, or number) for the first occasion where you ate fish yesterday (which includes finfish, shellfish, and seafood). Consider all meals and snacks, including fish within dishes such as soups. Include fish bought from a store, from a restaurant,**

or caught by you or someone else." (Enter description or occasion number in Table A-7)

10. **"What type of fish did you eat?"** (Refer to species display, if needed, enter species type in Table A-7; see Table A-4 above for list of species).

10a. **"How much of the** *(species type mentioned)* **did you eat?** (See quantity displays according to species type; enter portion size according to Table A-7a).

10b. **"How was the** *(species type mentioned)* **prepared or cooked?** (Unprompted, check box in Table A-7).

10c. **"Where did the** *(species type mentioned)* **come from? Was it from a market or store? Was it from a restaurant? Or was it caught by you or someone else (this includes Tribal distributions)?**

10d. **"Was it from Idaho waters or outside of Idaho?"** (Check box in Table A-7).

10e. "**Did you eat this species prepared in any other way or did you eat any other species of fish for** *(eating occasion mentioned) ?"*

11. "**Please think about the NEXT time you ate yesterday; when was that (name the eating occasion)? Did you eat fish?** (Check)

_____ Yes

_____ No

_____ Did not eat fish rest of day

If YES, repeat Question #10 above for up to 6 eating occasions.
If NO, repeat Question #11 for all eating occasions yesterday.
If "Did not eat fish rest of day," skip ahead to next section, Question #12

Table A-7. 24-Hr Recall: Types, Quantities, Methods, and Sources of Fish Eaten Yesterday

Occasion # & Description[1]		Species Type[2]	Portion Size / Quantity *See Displays (enter display #)*	Preparation / Cooking Method *Check box*	Source *Check box*
1		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐	☐ Market / Store ☐ Restaurant ☐ Caught ---

			Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ In Idaho ☐ Outside of Idaho
2		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
3		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other,	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

			Soup bowls: _____ cups Shellfish (organisms): _____	Unknown ☐ Casserole, Mixed Dish	
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
4		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐	☐ Market / Store ☐ Restaurant ☐ Caught ---

			Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
5		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted ☐ Casserole, Mixed Dish	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other, Unknown	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
6		Species 1:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____	☐ Fried / Sauteed ☐ Baked / Roasted ☐ Broiled / Grilled ☐ Poached / Boiled ☐ Dried, Smoked, Salted	☐ Stew, Soup ☐ Canned, Pickled ☐ Microwaved ☐ Raw / Uncooked ☐ Other,	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

			Soup bowls: _____ cups Shellfish (organisms): _____	Unknown ☐ Casserole, Mixed Dish	
		Species 2:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho
		Species 3:	Salmon sections #s _____ Trout (thin) fillets: _____ Lamprey sections: _____ Jerky packages: _____ Soup bowls: _____ cups Shellfish (organisms): _____	☐ Fried / Sauteed ☐ Stew, Soup ☐ Baked / Roasted ☐ Canned, Pickled ☐ Broiled / Grilled ☐ Microwaved ☐ Poached / Boiled ☐ Raw / Uncooked ☐ Dried, Smoked, Salted ☐ Other, Unknown ☐ Casserole, Mixed Dish	☐ Market / Store ☐ Restaurant ☐ Caught --- ☐ In Idaho ☐ Outside of Idaho

1. "Description" refers to a distinct fish-eating occasion defined by the respondent (breakfast, lunch, dinner, snack, or a time or number).
2. See Table A-4 for species list; will be coded later as anadromous, freshwater resident, or marine fish and shellfish.

Table A-7a. Portion Size Model Displays: Description and Use

Display Type[1]	Display Numbers[2]	Display Description	What Display Represents	How Respondents Report Portion Size	Associated Mass of Real Fish
Salmon	S1 to S9	Large rubber salmon fillet, cut into 24 servings	Cooked salmon and other fish species with thick fillets	Identify multiples and/or fractions for sections 1 to 24 in 0.25 increments	Serving sections range from 1.5 oz. (42 g) to 6.8 oz. (192 g) of uncooked fish
Trout	T1 to T9	Small plastic trout fillet, single serving	Cooked trout and other fish species with thin fillets	Identify multiples and/or fractions of the fillet in 0.25 increments	One fillet is 3.0 oz. (85 g) of baked fish, or 4.0 oz. (113 g) of uncooked fish
Lamprey	L1 to L9	Gray PVC pipe, 2" diameter, 14" long, notched every 2" for 7 servings	Cooked adult lamprey (eel)	Identify multiples and/or fractions of the 2” servings in 0.25 increments	Each 2" serving is calculated to be 4.0 ounces (113 grams) of uncooked fish
Jerky	J1 to J9	Package of real "salmon candy" (dried fish pieces)	Dried pieces of salmon and other fish species	Identify multiples and/or fractions of the package in 0.25 increments	Packages range from 2.4 oz. (68 g) to 3.0 oz. (84 g) of dried fish, or 5.6 oz. (159 g) to 6.5 oz. (187 g) raw fish
Bowls	B1 to B9 (each is set of 5)	Empty plastic bowls (¼, ½, 1, 1½, and 2 cups) of different colors	Containers to hold fish soup, composite dishes	Identify multiples and/or fractions of a cup in 0.25 increments	1 cup of fish soup is estimated to include 0.25 cup of cooked fish (2 oz. or 57 g) or 2.5 oz. (72 g) raw fish
Crayfish	C1 to C9	Color photograph (laminated) of whole crayfish	Cooked crayfish	Identify number of organisms	1 crayfish contains 0.26 oz. (7.2 g) of uncooked edible meat
Mussels	M1 to M9	Color photograph (laminated) of plate with 6 half-shell mussels	Cooked mussels and other bivalve shellfish	Identify number of organisms	1 mussel contains 0.4 oz. (10 g) of uncooked edible tissue
Shrimp	S1 to S9	Color photograph (laminated) of plate with 6 shrimp	Cooked shrimp	Identify number of organisms	1 shrimp contains 1.6 oz. (44 g) of uncooked edible tissue
Other	N/A	Can or jar of	Fish (tuna,	Identify multiples	Standard tuna can is 5

		fish (no display provided)	salmon) in a can or jar	and/or fractions of cans or jars in 0.25 increments	oz. (142 g); mason jar is 8 oz (227 g)

Notes

1. A total of nine identical copies of each model display type will be available for use during interviews (five for NPT and four for SBT).
2. Display numbers are written in permanent marker on every model display, as well as contact information for Kristin Callahan, RIDOLFI, 206-436-2774, in the event there are questions or need for replacements.

" = inches
g = grams
oz. = ounces

6.4 Other Dietary Information

"Now I will ask you general questions about your diet."

12. "**Was the amount of fish you ate yesterday more, less, or about the same as usual?"** (Check)

    _____ More than usual

    _____ Less than usual

    _____ About the same as usual

13. "**Are you currently on any kind of diet, either to lose weight or for some other reason?"** (Check)

    _____ Yes

    _____ No

    _____ Prefer not to answer

"This concludes the interview. Thank you SO very much for your time and cooperation today. Your participation will contribute significantly to the overall success of this survey and help protect the health of our Tribe. We will be calling a few people back just as a quality control measure. Thanks again for your time; that is all."

6.5 Post-Interview

Following the interview, the interviewer will record the telephone interview end time and length and acknowledge that he/she recorded the information truthfully and to the best of his/her ability by signing the following guarantee of authenticity.

Record interview end time and calculate interview length.

14. End time: _____ AM / PM (circle)

15. Length of interview: _____ (hours and/or minutes)

16. I, _____ (printed name of interviewer) hereby affirm that the answers recorded on this questionnaire reflect a complete and accurate accounting of my interview with the respondent.

    _____
    Signature of Interviewer

    _____
    Date

RE-INTERVIEW
QUESTIONNAIRE

7.0 INTERVIEW INTRODUCTION

Contact attempts (up to 7 attempts) will be made at varying days of the week and times of day. If no contact is made before the maximum number of attempts or by the end of the permitted one-month period (whichever comes first), contact attempts will be terminated. Upon contact by phone, the interviewer will record answers to re-interview questions.

0. Note outcome of contact attempts here:

_____ No reinterview, maximum no. of attempts reached

_____ No reinterview, respondent refused

_____ Reinterview commenced, responses below.

11. "Hello, I'm calling on behalf of ___*(name of Tribe and department)*__**. May I please speak with** __*(name of respondent)*_____**?"**

_____ Yes

_____ No

If YES and respondent is speaking or when the respondent comes to the telephone, continue to Question #2.

If NO, probe if he/she lives there, and if so, ask "**When is the best time to reach him/her?** (Record on log) "**Okay, thank you for your time. Good bye."**

If NO, not living there, ask "**What is the best way to reach him/her?** (Record new number on log) "**Okay, thank you for your time. Good bye."**

12. "Hello, my name is *(your name)* **."** Reintroduce Tribe if necessary**. "I am calling to thank you for your participation in our fish consumption survey. Can you please confirm that you participated in the first interview for this survey?** (Check)

_____ Yes, did participate

_____ No

_____ Do not remember

If YES, continue to Question #3.

If NO or Do not remember, probe by reminding him/her of the interview date, if he/she has a relative of the same name, etc.; otherwise, record on log, "**Okay, thank you for your time. Good bye."**

13. Great, I am calling to ask just a couple of the same questions for verification purposes. We do this to make sure we recorded it correctly the first time. The information that you provide is confidential. Today's survey takes less than 5 minutes. May we begin?"

If YES, **"Thank you for agreeing to participate,"** check box below and continue to Question #4.

☐ Interviewer: check this box if respondent agrees to participate in the telephone verification interview.

If NO, ask "**When is a good time to call back?** (Record notes for re-contact as needed) "**Okay, thank you for your time. Good bye.**"

14. When starting interview, record re-interview call information:

Date: _____/_____/_____ (mm/dd/yyyy)

Day (of the week): _____

Start time: _____ AM / PM *(circle)*

15. The number of contact attempts needed to reach and re-interview this respondent, including the successful re-interview, was _____. (note number)

8.0 INTERVIEW QUESTIONS

Questions from the original FFQ will be asked again for quality control purposes. Words to be spoken by the interviewer are identified in bold. Each question will be asked in numeric order. No photographic or portion model displays will be necessary.

"Thinking about your fish consumption in the past year,"

8.1 Chinook Salmon Consumption

68. "**In the past 12 months, did you eat Chinook salmon?"**

    If YES, check box in Table 1 and continue to Question #3.
    If NO, continue with Question #2.

69. **"Thank you. Just to be thorough, is it possible that during the past year you ate Chinook Salmon at a restaurant, a friend's house or another place, or someone brought fish to you?"**

    _____ Yes

    _____ No

    If YES, continue to QUESTION EXPLANATION below, then Question #3.

    If NO, skip to Question #8.

    QUESTION EXPLANATION

    "Please tell me about how much Chinook salmon you ate in the past 12 months (including the fillet and any parts). I will ask you how often you ate it. You will be able to respond according to two periods: when Chinook salmon is in-season and the rest of the year. Remember to consider breakfast, lunch, dinner, and snacks, and include fillets, stews, and other dishes. Do NOT include special events, such as feasts and ceremonies.

70. "**Did you eat about the same amount of Chinook salmon throughout the year, or did you eat more during certain periods and less during other periods of the year?"**

    _____Same

_____Not same

_____Don't know.refused

If SAME, ask Question #4 (but not Questions #5, #6 and #7), and complete Table 1 for one period; enter length of period as 12 months. If contradiction occurs (e.g., reports only 3 months), ask "**what about the rest of the year?"** (and consider as NOT SAME below).

If NOT SAME, skip to Questions #5, #6 and #7 and complete Table 1 for both high and low fish-eating periods.

71. "**In the past 12 months, how often did you eat Chinook salmon in any form (e.g., cooked or smoked fillets, dried, or soups)?"** Enter value and check the units (number of portions per day, per week, per month, or per year).

    Skip to Question #8.

72. "**In the past 12 months, how often did you eat Chinook salmon in any form (e.g., cooked or smoked fillets, dried, or soups) when it was in season?"** Enter value and check the units (number of portions per day, per week, per month, or per year). Record in Table 1.

73. "**Recognizing that past years may be different, how long was Chinook salmon in season (total in weeks or months)?**" Enter value in weeks or months.

74. "**In the past 12 months, how often did you eat Chinook salmon in any form (e.g., cooked or smoked fillets, dried, or soups) during the rest of the year?** Enter value and check the units (number of portions per day, per week, per month, or per year).

Table 1. FFQ: Frequency and Quantity of Chinook Salmon Eaten in Past 12 Months

Fish Species	Check if eaten	Consumption When Fish are In Season[1] Or Same Consumption Year Round				Consumption Rest of the Year (Blank if Same Consumption Year Round)			
		Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)	Length of period (weeks or months)	Number of Portions	Portions per day, week, month, or year (circle)	Typical Portion Size (& display #)[2]	Length of period (auto-calculated)
Chinook (King) Salmon			Day Wk. Mo. Yr.	NOT ASKED	Wk. Mo.		Day Wk. Mo. Yr.		Wk. Mo.

Notes

1. Fish consumption "in season" is based on respondent's perception or experience related to harvest and assumed higher consumption (compared to the rest of the year); biological seasons (e.g., fish runs) will be evaluated during data analysis and do not have to correspond to the duration of seasons noted by the respondent.

"The next two questions refer to your consumption of any species of fish, not just Chinook Salmon." *****Note, this interviewer's introductory sentence does not appear in the original questionnaire. It is added here because the theme just prior to this has been about consumption of Chinook salmon.*

8.2 Changes in Fish Consumption.

75. "**Has there been a change over time in your fish consumption?**" (Check)

_____ Yes

_____ No

_____ Prefer not to answer / Don't know

If YES, continue to Question #9.
If NO or PREFER NOT TO ANSWER/DON'T KNOW, skip to Question #10.

76. **"How has it changed most recently?"** (Check)

_____ Increased consumption

_____ Decreased consumption

_____ Other change (simply note if there has been a change that is not either 'increased' or 'decreased')

Technical note: The responses to this question have been modified from the original question in the full questionnaire by dropping the 'specify' entry for what 'other change' represents.

8.3 Demographic Information

(Check or enter – if respondent prefers not to say, enter 999)

77. "**How many people live in your household, including yourself?**"_____

9.0 INTERVIEW END

Upon completing the interview, the interviewer will offer appreciation and complete the remaining information, including signing a form verifying participation.

78. **"Thank you SO much for your time and cooperation."** Complete information below.

Record telephone verification interview end time.

79. End time: _____ AM / PM (circle)

80. Record the circumstances of the re-interview.

81. The interview was conducted (check one)

_____By phone

_____In person

Following the interview, the interviewer will acknowledge that he/she recorded the information truthfully and to the best of his/her ability by signing the following guarantee of authenticity.

I, _____ (printed name of interviewer) hereby affirm that the answers recorded on this questionnaire reflect a complete and accurate accounting of my verification interview with the respondent.

_____
Signature of Interviewer

_____
Date

Appendix B
Fish Consumption Survey
Portion Model Displays and Mass Calculations

For dietary assessments where food items are not weighed, portion sizes must be used (with frequency of consumption) to calculate consumption rates (Wrieden, et al., 2003). The U.S. Department of Agriculture (USDA), in partnership with the Centers for Disease Control and Prevention (CDC), uses 3-D food models for in-person interviews and 2-D photographs for follow-up telephone interviews to collect dietary information as part of the National Health and Nutrition Examination Survey (NHANES) (USDA, 2013). A similar approach has been successfully used for Tribal fish consumption surveys in California where University of California Davis researchers use 3-D fish fillet models of varying pre-determined masses to estimate Tribal fish consumption rates (Shilling, 2014). The USDA recommends that models represent foods "as consumed" as much as possible (for most accurate reporting); i.e., familiar in appearance and preparation method (Moshfegh, 2014). Broadly, the models used in this survey can be grouped into three types: life size depictions of fish portions (e.g. fillets), depictions of numbers of organisms consumed per serving (e.g. shellfish), or volumes of tissue or composite dishes consumed (e.g. bowls for fish meat or soup containing fish). The U.S. Environmental Protection Agency (USEPA) recommends reporting the portions in uncooked weights, however, since contaminant concentrations are measured in raw fish tissue (Kissinger, 2014). Recognizing that fish is eaten in various forms, bowls may be used as a measuring guide for fish stews and other composite dishes; although a standard recipe must be determined in advance to equate the bowl quantity to fish mass. Some respondents to this survey also reported consumption of fish tissue in volumetric terms. For example, consumption of crab meat might be reported in terms of cups of crab meat consumed. Once respondents are familiar with the models, photographs of the models can be given to respondents for the follow-up telephone interviews (CDC, 2010).

The list of common species used during the interviews to determine fish consumption is provided in Table B1 below. The fish model displays used to determine portion sizes consumed of those species are described in Table B2, followed by photographs and a discussion of the models and the mass calculations. There were nine to 11 copies of each display type, depending on the number of interviewers and whether replacements were necessary during the survey. The model displays, which represent common species and preparation methods, included the following:

1. Large cooked salmon fillet replica, cut into servings
2. Small cooked trout fillet replica, single serving
3. PVC pipe to represent lamprey
4. Fish jerky pieces (real, packaged) to represent dried fish
5. Measuring bowls for soups and composite dishes
6. Photographs of shellfish, including mussels, crayfish, and shrimp

Table B1. Survey Species List

SALMON AND STEELHEAD
Chinook (King) Salmon
Coho (Silver) Salmon
Sockeye (Red) Salmon
Kokanee (resident form of sockeye)
Steelhead (migratory form of rainbow trout)
Other salmon species (specify, e.g., Chum, Pink, Atlantic salmon)
RESIDENT TROUT
Rainbow Trout
Cutthroat Trout
Cutbow Trout (hybrid of Rainbow and Cutthroat Trout)
Bull Trout (Dolly Varden)
Brook Trout
Lake Trout
Brown Trout
Other trout species (specify)
OTHER FRESHWATER FISH AND SHELLFISH
Sturgeon
Lamprey
Whitefish
Sucker
Burbot
Northern Pikeminnow (Squawfish)
Bass
Bluegill
Carp
Catfish
Crappie
Sunfish
Tilapia
Walleye
Yellow Perch
Other freshwater finfish (specify)
Crayfish
Freshwater Clams or Mussels
SEAFOOD / MARINE FISH AND SHELLFISH
Cod
Halibut
Pollock
Tuna
Lobster
Crab
Marine Clams or Mussels
Shrimp
Other marine fish or shellfish (specify)

Table B2. Description of Portion Size Model Displays

Display Type[1]	Display Numbers[2]	Display Description	What Display Represents	How Respondents Report Portion	Associated Mass of Uncooked Fish
Salmon	S1 to S9	Large rubber salmon fillet, cut into 24 servings	Cooked salmon and other fish species with thick fillets	Identify multiples and/or fractions for sections 1 to 24 in 0.25 increments	Servings range from 1.5 oz. (42 g) to 6.8 oz. (192 g) uncooked fish
Trout	T1 to T9	Small plastic trout fillet, single serving	Cooked trout and other fish species with thin fillets	Identify multiples and/or fractions of the fillet in 0.25 increments	One fillet is 3.0 oz. (85 g) of baked fish, or 4.0 oz. (113 g) of uncooked fish
Lamprey	L1 to L10	Gray 14" PVC pipe, 2" diameter notched every 2" for 7 servings	Cooked adult lamprey (eel)	Identify multiples and/or fractions of the 2" servings in 0.25 increments	Each 2" serving is calculated to be 4.0 oz. (or 113 g) of uncooked fish
Jerky	J1 to J11	Package of real "salmon candy" (dried fish pieces)	Dried pieces of salmon and other fish species; also crab or similar-shape tissue	Identify multiples and/or fractions of the package in 0.25 increments	Packages range from 2.4 oz. (68 g) to 3.0 oz. (84 g) of dried fish, or 5.6 oz. (159 g) to 6.5 oz. (187 g) uncooked fish
Bowls	B1 to B9 (each is set of 5)	Empty plastic bowls (¼, ½, 1, 1½, and 2 cups) of different colors	Containers to hold fish soup, composite dishes	Identify multiples and/or fractions of a cup in 0.25 increments	1 cup of fish soup includes 0.25 cup of cooked fish (2 oz. or 57 g) or 2.5 oz. (72 g) uncooked fish; If not soup, 1 cup of fish (8 oz or 227 g) or 10.7 oz (302.4 g) uncooked fish
Crayfish	C1 to C10	Color laminated photograph of whole crayfish	Cooked crayfish	Identify number of organisms	1 crayfish contains 0.26 oz. (7.2 g) of uncooked edible tissue
Mussels	M1 to M10	Color laminated photograph of plate with 6 half-shell mussels	Cooked mussels and other bivalve shellfish	Identify number of organisms	1 mussel contains 0.4 oz. (10 g) of uncooked edible tissue
Shrimp	Sh1 to Sh10	Color laminated photograph of plate with 6 shrimp	Cooked shrimp	Identify number of organisms	1 shrimp contains 1.6 oz. (44 g) of uncooked edible tissue

Notes: " = inches, g = grams, oz. = ounces

9.1.1 Salmon Fillet Model Display

A 3-D replica of a Chinook salmon fillet was obtained from a local Seattle artist (Figure B1). The fillet (with skin and tail) was made of a flexible and durable urethane rubber, which was poured into a latex mold built based on a fresh (brined) ocean-caught Chinook salmon fillet. The rubber model was painted the color of cooked salmon muscle (fillet) and other tissues (skin and tail). The rubber model weighed 6.8 pounds; the fillet part of the model, which was used to report portion sizes (without skin or tail), had a total length of 29 inches, a width ranging from 3 inches (at the tail end) to 7.5 inches (in the middle), and a depth up to approximately 1 inch.

The salmon replica was used as a model display to indicate portion sizes of all species of baked or smoked salmon, including Chinook, coho, and sockeye salmon, and also other large fish with thick fillets, such as sturgeon or halibut, assuming the respondents could associate the model cross-species. The fillet was cut into 24 servings, each of which was labeled with a number (1 through 24). During the interviews, respondents indicated which serving pieces represented their average portion size, and the interviewers recorded those numbers for each species type (translated to mass during data analysis). The display number (S1 to S9) of the specific model used during the interview was also recorded.

Figure B1. Salmon Fillet Replica (24 Servings)

To equate fish model servings to mass of fresh fish, a Chinook salmon of comparable size was obtained from the Pike's Place Market in Seattle, Washington. Professional staff at the fish market filleted and skinned an ocean-caught Chinook salmon and cut it into servings as equal to the model servings as possible. The whole raw fish (with skin, but no tail) weighed approximately 7 pounds; 6.8 pounds without the skin. Each serving was later weighed (in ounces and grams) on a scale (precision of +/- 2 grams), both uncooked and cooked (after oven-baking for 30 minutes). There was an average 12% loss of mass from the light baking process. Due to the amorphousness of fresh fish (and, therefore, the model), servings nearest the head and tail were found to have less mass (about half) than those in the middle of the fillet. Uncooked fish mass of each of the 24 servings of fresh fish (representing the 24 servings of the portion model) is presented in Table B4 in section 9.1.11.

9.1.2 Trout-Like Fillet Model Display

A 3-D replica of a baked tilapia fillet from Barnard, Ltd. (made of flexible plastic resin, latex- and lead-free, 3.5 x 5-inches, and weighing 2.6 ounces), was used as a model display to indicate portion sizes of baked or smoked trout and other fish species with lighter-colored tissue and thinner fillets as compared to salmon (Figure B2). The trout-like replica represented a 3-ounce (or 85-gram) fillet of baked fish, and was versatile enough to represent a variety of freshwater and marine species. Respondents reported fractions (0.25, 0.5, and 0.75) and/or multiples (1, 2, 3, etc.) of the fillet to indicate their portion size, and interviewers recorded that number (translated into total mass during data analysis). The display number (T1 through T9) of the specific model used during the interview was also recorded.

Figure B2. Trout-Like Fillet Replica (Single Serving)

Based on the replica representing a 3-ounce baked fish fillet, and assuming a 25% moisture loss during the baking process (see Attachment 1; USEPA, 2014), Table B5 in section 9.1.11 presents various portion sizes converted into uncooked fish mass (based on fractions or multiples of 1). One serving (one whole trout fillet) that is 3 ounces (85 grams) baked equates to 4 ounces (113 grams) uncooked.[3] Additional multiples and/or fractions reported by respondents were calculated during data analysis.

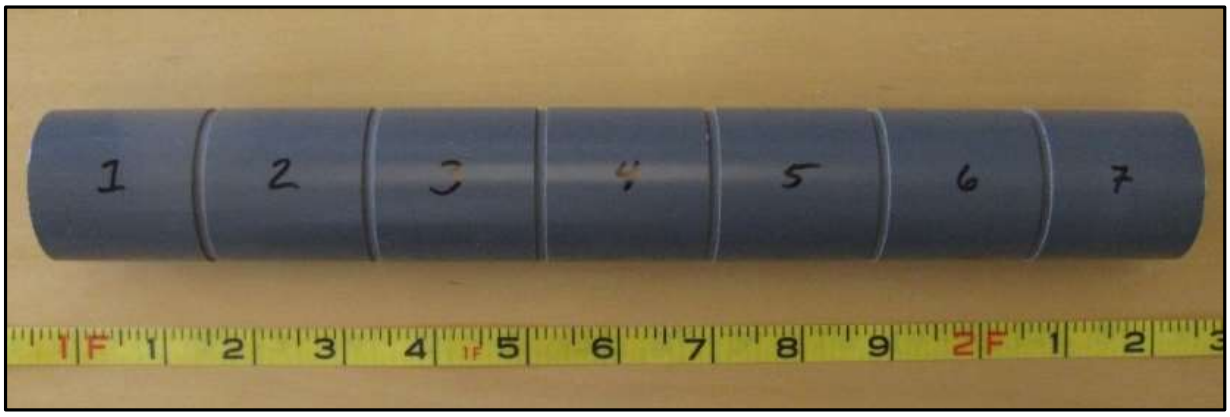
9.1.3 Lamprey (PVC Pipe) Display

Lamprey (eel) is a unique anadromous species type consumed by Tribal members. As recommended by Tribal Representatives, a 14-inch long, 2-inch diameter gray PVC pipe was used as a model display to indicate portion sizes of lamprey (Figure B3). The length was an approximate average size of an adult lamprey post-migration, preparing to spawn up-river (Kostow, 2002). The PVC pipe had section marks notched every 2 inches to indicate servings.

[3] Values shown in ounces and grams reflect the direct mass conversions from cooked to uncooked weights (according to the equation in Attachment 1).

Each 2-inch serving was labeled with a number (1 through 7). Respondents reported fractions (0.25, 0.5, or 0.75) and/or multiples (1, 2, 3, etc.) of a serving to represent their average portion size, and the interviewers recorded that number (translated into total mass during data analysis). The display number (L1 to L10) of the specific pipe used during the interview was also recorded.

Figure B3. PVC "Lamprey" Pipe (7 Servings)



Assuming a density as least as great as other fresh (raw) fish muscle, approximately 1.1 g/cm3 (UNFAO, 2014a), and a calculated volume of a cylinder section (102.9 cm^3), the mass of each 2-inch serving was estimated to be 4.0 ounces (113 grams). Table B5 in in section 9.1.11 presents portion sizes as fractions and multiples of one (1) serving. Additional multiples and/or fractions of these servings reported by respondents were calculated during data analysis.

9.1.4 Jerky / Dried Fish Display

In cases where respondents reported eating any species of fish (salmonid or other) in a dried form, real fish jerky (known as "salmon candy"), protected in a sealed package, was used to indicate portion sizes (Figure B4). Respondents reported fractions (0.25, 0.5, or 0.75) and/or multiples (1, 2, 3, etc.) of the approximately 3-ounce (85-gram) package of dried salmon to indicate their portion size, and the interviewers recorded that number (translated into total mass during data analysis). The display number (J1 to J11) of the specific package used during the interview was also recorded.

In this case, recording the specific display number was particularly important because, although the label stated that there were 3 ounces (85 grams) in every package, the true mass was found to vary between packages (and was generally less). Two extra packages were purchased and opened, and the contents were weighed (in ounces and grams) on a scale (precision of +/- 2 grams). The dried salmon within each of these packages was measured at 2.6 ounces (72 grams), and the package alone weighed 0.2 ounces (5.7 grams). Without opening the display packages to be used during the survey (to maintain the integrity of the contents), each whole package was weighed and, subtracting the weight of the bag (0.2 ounces), total mass of dried fish was calculated. That mass, without a moisture loss conversion, was used for reporting fresh tissue such as crab.

Figure B4. Package of Real Jerky/Dried Fish ("Salmon Candy")

To represent dried fish, assuming a 57% moisture loss during the desiccation process (Attachment 1; USEPA, 2014), Table B6 in section 9.1.11 presents the mass of salmon jerky measured in each display package converted to uncooked mass (based on fractions or multiples of 1). One serving (one whole package of display J1) that was 2.5 ounces (70 grams) dried, for example, converted to 5.8 ounces (163 grams) uncooked. Fractions and/or multiples of one serving (one package) were calculated based upon one (1) serving of the particular display package during data analysis.

9.1.5 Soup Bowl Display

For fish soups and composite dishes, portion sizes were determined using empty hard-plastic bowls of different quantities (and colors) within a ¼-cup (red), ½-cup (yellow), 1-cup (purple), 1½-cup (blue), or 2-cup (green) bowl (Figure B5). Respondents reported the fractions (0.25 or 0.5 cup) or multiples (1, 1.5, 2 cups, etc.) of one cup to indicate their portion size, and the

interviewers recorded that number (translated into mass of fish during data analysis). The display number (B1 to B9) of the measuring bowl set used during the interview was also recorded.

Figure B5. Measuring Bowls for Fish Soups

As suggested by Tribal representatives (Holt, et al., 2014), it was estimated that 1 cup of soup contained approximately 0.25 cup (or 2 ounces or 57 grams) of cooked fish (i.e., soup was 25% fish). Based on the assumption that a one (1)-cup serving of soup contained 2 ounces (57 grams) of cooked fish, and assuming a moisture loss of 21% from cooking in soup ("wet cooked in moist heat"), Table B5 in section 9.1.11 presents the mass of uncooked fish according to number of cups (servings) of soup (based on fractions or multiples of 1) (Attachment 1; USEPA, 2014). Additional multiples and/or fractions that were reported by respondents were calculated during data analysis. Note that the measuring bowls were intended to represent soups, stews, chowders, or other composite dishes such as casseroles, applying the same general assumption of 1 cup composite dish: 0.25 cup cooked fish ratio. As has been noted, some respondents reported consumption of fish or shellfish tissue in volumetric terms. When the bowls were used to describe fish volume rather than soup, it was assumed that one cup corresponded to 8 ounces (227 g) of cooked fish and 10.7 ounces (302.4 g) of uncooked fish, assuming a 25% moisture loss, as from canning or a dry heat method (Table B3).

9.1.6 Shellfish Photograph Displays

For shellfish, portion sizes were determined using laminated color photograph displays (photo-displays), printed to 100% scale (actual size). There was a photo-display of a single, whole crayfish (tail tucked under); a photo-display of mussels (six half shells on a plate) to represent marine and freshwater bivalves (clams and mussels); and a photo-display of shrimp (six on a plate), as shown on Figures B6 through B8, respectively. Respondents reported numbers of organisms (e.g., number of crayfish, mussels, or shrimp) to indicate their portion size, and the interviewers recorded that number (translated into mass of shellfish during data analysis). The photo-display number (C1 to C10 for crayfish; M1 to M10 for mussels; or SH1 to SH10 for shrimp) of the specific photo-display used during the interview was also recorded.

Figure B6 illustrates a native crayfish, *Pacifastacus leniusculus*, the most widely distributed species in the Pacific Northwest (Johnsen and Taugbøl, 2010; Larson and Olden, 2011), which

was obtained from the Columbia River watershed and purchased at the Pikes Place Market in Seattle, Washington. Weight of the whole uncooked organism was measured at 1.3 ounces (36 grams). The primary edible tissue of crayfish is the tail (abdominal muscle), the percent (to whole body) of which depends on size and maturity. The edible portion of *P. leniusculus* has been estimated to be 15 to 25% of total body weight (Lee and Wickins, 1992, as cited in Harlioğlu, 1996). Assuming that an average 20% of body mass is edible tissue, the mass consumed per single organism (of a size organism shown in the figure) is 0.26 ounces (7.2 grams). Total numbers of crayfish reported by respondents as the portion size consumed were recorded and the associated mass was calculated during data analysis.

Figure B6. Crayfish Photo-Display

Figure B7 illustrates a common intertidal zone bivalve, *Mytilus edulis* or Blue Mussel, which is found on the Pacific coast of the U.S. and is domestically farmed (NOAA, 2014). Freshwater mussels are in a different subclass of bivalves than the marine species, but are superficially similar in appearance. The figure is intended to represent all types of marine and freshwater bivalves that may be consumed by participants. The shell (half) is included with cooked mussel meat in the photograph to display a familiar preparation method, but it is the edible soft tissue that is of interest. Soft tissue can be nearly 50% of total live (wet) weight when the organism is in best condition (UNFAO, 2014b). One study reported that organisms investing energy in shell growth may actually limit soft tissue growth (Gimin et al., 2004). For this study, average tissue weights, which vary by species, age, gender, density, season, food availability, and other environmental conditions, were used for portion size calculations.

Multiple sources of information were investigated to determine the average mass of soft tissue consumed per bivalve organism. The mean wet weight of edible soft tissue of a single mussel consumed by California Indians was reported (in an archeological study) as 1.065 grams, but with no supporting documentation (Heizer and Whipple, 1971). A more recent study of *Mytilus edulis* in Quebéc, Canada, collected 4,224 juvenile mussels and measured an average soft tissue dry weight (ash free) of 0.037 grams (Alunno-Bruscia et al., 2001), which equates to 0.42 grams

wet weight (likely a juvenile that is too small to be edible). Finally, a reference documenting the life history of mussels suggested that average large adult mussel soft tissue weighs 1 g dry weight (Newell and Moran, 1989), which (assuming 10% solids) equates to 10 g. This value was used to represent the mass of a single bivalve organisms. Total numbers of mussels or clams reported by respondents as the portion size consumed were recorded, and the associated mass was calculated during data analysis.

Figure B7. Mussels Photo-Display

Figure B8 illustrates a large shrimp, likely *Pandalus borealis*, northern prawn or pink shrimp. Large males commonly reach 170 millimeters (mm) (6.69 inches), which (when including head) approximates the organism sizes in the photograph. Based on a total length to weight conversion cited by the U.S. Fish and Wildlife Service (Nichols, 1982 as cited in Bielsa, et al., 1983), a length of 170 mm equates to 44 grams (1.6 ounces). This value was used to represent the mass of a single shrimp organism, based upon fractions and multiples of 1. Total numbers of shrimp reported by respondents as the portion size consumed were recorded, and the associated mass was calculated during data analysis.

Figure B8. Shrimp Photo-Display

9.1.7 Fish in Cans or Jars

For fish reported as eaten from cans or jars, the following assumptions were made: 1 standard can of tuna (or other commercially canned fish) contains 5 ounces of cooked fish and 1 standard Mason jar of salmon (or other fish, home-canned) contains 8 ounces of cooked fish. Based on a moisture loss of 25% during the canning process (Attachment 1; USEPA, 2014), a single can or jar equates to 6.7 ounces (189 grams) and 10.7 ounces (302 grams) of uncooked fish, respectively. Table B5 in section 9.1.11 presents the uncooked fish mass associated with fractions and multiples of 1 can or 1 jar, respectively, of cooked fish.

9.1.9 References

Alunno-Bruscia, M, E. Bourget, and M. Fréchette. 2001. *Shell Allometry and Length-Mass-Density Relationship for Mytilus edulis in an Experimental Food-Regulation Situation.* Mar Ecol Prog Ser. 219: 177-188. September.

Bielsa, L.M., W.H. Murdich, and R.F. Labisky. 1983. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (South Florida): Pink Shrimpl.* U.S. Fish and Wildlife Service. Biological Report 82(11.17), TR EL-82-4. Prepared for U.S. Army Corps of Engineers.

Center for Disease Control and Prevention (CDC). 2010. *USDA Food Model Booklet.* National Health and Nutrition Examination Survey. Last modified: May 2010. Available: http://www.cdc.gov/nchs/nhanes/measuring_guides_dri/2002/fmb.htm

Colter, C. and C. Tanaka. 2014. Personal communication with the Shoshone-Bannock Tribes. Restoration Workshop, March 5-6, and subsequent communication with K. Callahan, RIDOLFI. Shoshone-Bannock Tribes Fish and Wildlife and Water Resources Departments. Fort Hall, Idaho.

Dare, P.J. and D.B. Edwards. *Seasonal Changes in Flesh Weight and Biochemical Composition of Mussels (Mytilus edulis L.) in the Conwy Estuary, North Wales.* J Exper Mar Biol. 18(2):89-97. Elsevier.

Gimin, R., R. Mohan, L.V. Thinh, and A.D. Griffiths. 2004. *The relationship of shell dimensions and shell volume to live weight and soft tissue weight in the mangrove clam, Plymesoda erosa (Solander, 1786) from northern Australia.* WorldFish Center Quarterly. Vol. 27 No. 3&4. Jul-Dec.

Harlioğlu, M.M. 1996. *Comparative Biology of the Signal Crayfish, Pacifastacus leniusculus (Dana), and the narrow-clawed crayfish, Astacus leptodactylus Eschsholtz.* Thesis submitted to University of Nottinham for the degree of Doctor of Philosophy. Department of Life Science.

Heizer, R.F. and M.A. Whipple (Eds). 1971. *The California Indians, A Source Book.* Second Edition. University of California Press. Accessed through Google Books. Available: http://books.google.com/books?id=ZjUOmWWyGSMC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false

Holt, J., K. Clark, and J. Oatman. 2014. Personal communication with the Nez Perce Tribe. Restoration Workshop, March 5-6, and subsequent communication with K. Callahan, RIDOLFI. Nez Perce Tribe Water Resources and Fisheries Departments. Lapwai, Idaho.

Idaho. 2013. *Idaho Fish Consumption Rate Recommended Sample and Questions.* Prepared for the Idaho State Department of Environmental Quality by the Boise State University Public Policy Center. December 19.

Johnsen, S.I. and T. Taugbøl. 2010. *NOBANIS – Invasive Alien Species Fact Sheet – Pacifastacus leniusculus.* Online Database of the European Network on Invasive Alien Species – NOBANIS www.nobanis.org. Accessed 6/3/14.

Kissinger, Lon. 2014. Personal communication with K. Callahan, RIDOLFI, on February 20, 2014. Risk Assessor, U.S. Environmental Protection Agency, Region 10.

Kostow, K. 2002. *Oregon Lampreys: Natural History Status and Analysis of Management Issues.* Oregon Department of Fish and Wildlife, Fish Division. Information Reports No. 2002-01. February 25.

Larsen, E.R. and J.D. Olden. 2011. *The State of Crayfish in the Pacific Northwest.* University of Washington, School of Aquatic and Fishery Sciences. Fisheries, Vol. 36, No. 2. February.

Moshfegh, Alanna. 2014. Personal communication with K. Callahan, RIDOLFI, on January 13, 2014. Supervisory Nutritionist, U.S. Department of Agriculture.

National Oceanic and Atmospheric Administration (NOAA). 2014. FishWatch, U.S. Seafood Facts, Blue Mussel. Available: http://www.fishwatch.gov/seafood_profiles/species/mussels/species_pages/blue_mussel_farmed.htm. Accessed 6/6/14.

Newel, R.I.E. and D. Moran. 1989. *Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (North and Mid-Atlantic): Blue Mussel.* University of Maryland and U.S. Fish and Wildlife Service. Biological Report 82(11.102), TR EL-82-4. Prepared for U.S. Army Corps of Engineers. June.

Shilling, Fraser. 2014. Personal communication with K. Callahan, RIDOLFI, on February 6, 2014. University of California at Davis.

United Nations Food and Agriculture Organization (UNFAO). 2014a. *Measures, Stowage Rates and Yields of Fishery Products.* Available: http://www.fao.org/wairdocs/tan/x5898e/x5898e01.htm#Densities and stowage rates

United Nations Food and Agriculture Organization (UNFAO). 2014b. Fisheries and Aquaculture Department. United Nations. Accessed June 3, 2014. Available: http://www.fao.org/fishery/culturedspecies/Mytilus_galloprovincialis/en

United States Department of Agriculture (USDA). 2013. *Food Surveys: What We Eat in America, NHANES.* Agriculture Research Service. Last modified: November 2013. Available: http://www.ars.usda.gov/Services/docs.htm?docid=13793

United States Environmental Protection Agency (USEPA). 2014. *Estimated Fish Consumption Rates for the U.S. Population and Selected Subpopulations (NHANES 2003-2010), Final Report.* EPA-820-R-14-002. April.

Wrieden, W., H. Peace, J. Armstrong, and K. Barton. 2003. *A short review of dietary assessment methods used in National and Scottish Research Studies.* Available: http://multimedia.food.gov.uk/multimedia/pdfs/scotdietassessmethods.pdf

COOKING LOSS FACTORS

Similar to the Idaho Tribal Fish Consumption Survey, NHANES participants report the amount of fish consumed "as prepared," which is converted to a raw wet weight in grams. Since the process of cooking changes the moisture content of fish, a weight conversion based on the estimated moisture loss due to cooking is required to calculate the grams of raw fish consumed (USEPA, 2014). Adjustment factors for cooking loss used by NHANES, and reported by EPA, are provided in Table B3 (with values in bold associated with key preparation methods presented in this study; notes in italics have been added by the authors).

The following equation is used to convert cooked mass to uncooked (raw) mass:

$$\text{Weight of raw fish} = \frac{\text{Weight of cooked fish}}{1 - (\%\ \text{Moisture Loss}/100)}$$

Table B3. Estimated Fish Moisture Loss Due to Cooking

Cooking / Preparation Method	Percent moisture loss
Dried *(e.g. jerky)*	**57**
Kippered	46
Smoked, (other than salmon)	36
Salted	33
Canned	**25**
Cooked, dry heat *(e.g., baked)*	**25**
Restructured	25
Cooked, moist heat *(e.g., soup)*	**21**
Smoked salmon	17
Pickled	16
Fried	12
Raw	0

Source: USEPA, 2014

Figure B9. Species Identification Photographs

(See supplemental PDF file.)

Figure B9 shows the species identification photographs used by the interviewers to facilitate the administration of the questionnaire.

9.1.10 Portion-to-Mass Calculations

More specific details of the portion-to-mass conversion procedure are described below, including the specific factors used for each portion model, how write-in species were handled, how can and jar portion sizes were determined, how shellfish portion sizes were determined, and special-case exceptions to the overall procedure.

9.1.11 Portion-to-Mass Conversion Tables

The portion-to-mass conversion factors for each model are shown in Tables A (salmon fillet sections), B (trout, soup bowl, lamprey, shellfish, can and jar models), and C (jerky models). Two different conversion factors were determined for bowls, depending on whether the respondent likely intended the bowl to refer to the total volume of a composite dish of which fish was only one component or whether the bowl referred to the actual volume of fish. The most common example of the latter would be canned tuna, as used, for example, in a tuna fish sandwich. The bowl conversions are described in detail in section 9.1.12 of this appendix.

Lastly, two conversion factors were used for each jerky model, with and without adjustment for moisture loss due to drying. The moisture-loss-adjusted conversion was used for most species. However, for certain species (noted in Table B6) it was assumed that the respondent utilized the jerky model to describe consumption due to the visual appearance of the model rather than to imply it was consumed in a dried form. In those cases, the conversion without moisture loss adjustment was used.

Table B4. Portion-to-mass conversions for the salmon replica with fillet divided into sections

Fillet Section Number	Portion-to-Mass (grams)	Fillet Section Number	Portion-to-Mass (grams)
1	50	13	192
2	80	14	180
3	92	15	178
4	112	16	162
5	124	17	170
6	132	18	138
7	176	19	124
8	190	20	110
9	174	21	88
10	170	22	88
11	178	23	66
12	176	24	42

Table B5. Portion-to-mass conversions for other models.

Model	Unit	Portion-to-Mass (grams)*
Trout replica	1 fillet	113.4
Measuring bowls (for soup, stew, etc.)**	1 cup	72.2
Measuring bowls (for fish volume)**	1 cup	302.4
Lamprey	1 serving	113.2
Crayfish	1 organism	7.2
Mussel	1 organism	10.0
Shrimp	1 organism	44.0
Can	1 5 oz can***	302.4
Jar	1 8 oz jar***	189.0

*Values rounded to 1 decimal digit for display although 4 decimal digits were used for calculations to avoid accumulating rounding errors;

**The 72.2 grams conversion factor was used when the respondent described consumption using the measuring bowl and either 1) specified the preparation as soup or stew (24 hour recall only) or 2) the species being described was clams, mussels or lamprey (FFQ only); this factor assumed only a portion of the volume was fish; otherwise, the 302.4 grams factor was used, which assumed the entire volume was fish (see section 9.1.12 of this appendix);

The conversion factor was adjusted proportionally if a non-standard size was specified (i.e., not 5 oz. or 8 oz.) as described in the ***Portion-to-mass conversions for cans and jars section below.

Table B6. Portion-to-mass conversions for jerky, depending on the jerky model and species.

	Portion-to-Mass (grams)*	
Jerky Model	With Moisture Loss Adjustment (Species Group A)	Without Moisture Loss Adjustment (Species Group B)
J1	163.5	70.3
J2	172.8	74.3
J3	168.1	72.3
J4	163.5	70.3
J5	163.5	70.3
J6	158.8	68.3
J7	168.1	72.3
J8	163.5	70.3
J9	186.7	80.3
J10	196.0	84.3
J11	191.4	82.3

Group A contains all salmon, steelhead, freshwater finfish, cod, halibut, pollock, and other marine finfish not in group B;
Group B contains all freshwater and marine shellfish, tuna and sardines;
See Table B3 for moisture loss adjustment factors;
*Values rounded to 1 decimal digit for display although 4 decimal digits were used for calculations to avoid accumulating rounding errors.

9.1.12 Write-In Species Corrections and Mapping

In CAPI, several general species categories allowed the respondent to describe consumption of specific but unlisted species, such as pink salmon or oysters. These species categories include other salmon, other trout, other freshwater finfish, other marine fish or shellfish, and other fish or shellfish. In each case, the interviewer was able to write in the name of the specific species.

Because these write-in fields allowed unrestricted free text, there were occasional spelling variations and instances where a listed species (e.g., tuna) was written in or a write-in species belonged in a more specific species category. For example, marine clams or mussels would be a more specific category for a write-in of butter clams rather than "other marine fish and shellfish." All write-in text instances were examined manually to correct for spelling variation and remap to a more specific CAPI species category when needed. These changes, which were made in consultation with Ridolfi staff, facilitated species-specific portion-to-mass conversions and species grouping for reporting.

9.1.13 Portion-to-Mass Conversions for Soup Bowls

The soup bowls were originally intended to be used only for specifying soups, stews, or other composite dishes where the fish was only a component of the total volume; however, during the course of interviewing it was found that respondents more often used this model to describe the volume of fish they consumed, not including other non-fish components. This was particularly common for tuna, crab and lobster meat and small shrimp, the latter being difficult to count

individually, as would be required to utilize the shrimp model. In contrast, clams or mussels were most often consumed and described as soups.

Whether the respondent intended the soup bowl to refer to A) the total volume of a composite dish or B) only to the volume of fish contained in the dish was not recorded by the interviewer. However, through discussions with the interviewer supervisor (who performed and observed a number of interviews) and some of the interviewers who performed a large number of interviews, it was determined which species were most commonly described as type A or type B. The type A species (fish was a component of soup or stew) were determined to be freshwater clams or mussels, marine clams or mussels and lamprey. All other species were type B.

When performing the mass conversions for the FFQ interviews, where a preparation method was not recorded, type A species described using bowls were converted using 72.2 grams per 1 cup bowl (see Figure B5 of this appendix). Type B species were converted using 302.4 grams per 1 cup bowl. This conversion assumed a 25% moisture loss, the same factor assumed for canned fish or fish cooked with a dry heat (Table B3).

However, when performing the mass conversions for the 24 hour recall, the 72.2 grams per 1 cup bowl conversion (type A) was used only when the preparation was noted as soup or stew, regardless of species. The 302.4 grams per 1 cup bowl conversion (type B) was used for all other preparations, including casserole or mixed dish (a single category). This preparation was most often used to refer to the final form of the dish rather than how the respondent described the portion size. For example, a tuna fish sandwich or shrimp salad would be described as a mixed dish, but the soup bowl model was used to describe the amount of tuna or shrimp included instead of the total volume of the final dish. This is the only aspect of the portion-to-mass conversions which differed between the 24 hour recall and FFQ.

9.1.14 Portion-to-Mass Conversions for Cans and Jars

When respondents provided portion sizes in terms of cans or jars, the interviewer had a text field in which to capture specific descriptions. Unless otherwise specified, cans were assumed to be 5-oz. and jars 8-oz. In consultation with Ridolfi, an algorithm was developed which utilizes the species and text description field to determine the most appropriate portion-to-mass conversion. The steps of the algorithm are as follows:

1. If an unambiguous container size could be determined from the text field (e.g., 6 oz., 1 qt., 1 cup), this size was used for the conversion.
2. Otherwise, if the text field contained the string “can” and did not contain “jar” (which would create an ambiguity), then 5 oz. was assumed.
3. If the text field contained the string “jar” but not “can,” then 8 oz. was assumed.
4. Finally, if a size could not be determined by steps 1–3, a default was assumed based on the species. For all freshwater species, cod, halibut, and pollock, 8 oz. was assumed. For the remaining marine species, 5 oz. was assumed.

9.1.15 Portion-to-Mass Conversions for Number of Shellfish

When reporting consumption of shellfish, the respondent had the option of specifying the number of organisms. There were three portion models for this purpose: crayfish, mussels, and shrimp, each with different portion-to-mass conversion factors. In November 2014, a field was added to CAPI to allow the interviewer to record which model was used. Due to restrictions in CAPI, this was implemented as a text field and the interviewer was instructed to use "C" for crayfish, "M" for mussels, and "S" for shrimp. However, the text field also allowed other text, and an algorithm was developed in consultation with Ridolfi staff to examine the model text field and the species field to determine the most appropriate model for mass conversion. The procedure used is:

1. For any clams or mussels species, "mussels" was chosen regardless of the shellfish model recorded.
2. For other species, if a valid shellfish model code (C, M, S) could be determined from the text field, that model was chosen.
3. If a valid shellfish model could not be determined, Table B7 was used to choose the likely model used:

Table B7. Choice of shellfish model *when not specified by the interviewer*.

Species in CAPI	**Chosen Shellfish Model**
Crayfish, lobster, crab	Crayfish
Freshwater clams or mussels, marine clams or mussels, oysters, scallops	Mussels
Shrimp, prawns, squid, octopus	Shrimp

9.1.16 Exceptions to the Portion-to-Mass Conversion Procedure

[NPT]

Two records that did not follow the expected protocol were manually modified to perform the mass conversion. These are described below:

1. One respondent reported shark consumption in a higher consumption period and a lower consumption period. The respondent reported consuming shark once per year in the higher period and 0 times per year in the lower period, but did not provide the duration of the higher period. This was manually converted into once per year as a single period instead of a higher and lower period. The standard portion-to-mass conversion procedure was then applied to the modified record.

2. One respondent reported consuming alligator as 2 soup bowls per year. This response was excluded because the alligator is neither a finfish nor a shellfish.

[SBT]

Three records that did not follow the expected protocol were manually modified to perform the mass conversion. In two cases, the two respondents reported consuming sardines but described their portion sizes using the "number of organisms" field, which is typically reserved for shellfish. In the remaining record, one respondent reported consuming 5 fish sticks using the "number of organisms" field.

For the two sardine cases, the interviewer recorded sardines as the shellfish model, so these responses were interpreted as the number of individual sardines. Through consultation with Ridolfi staff, it was determined that a 5-oz. can would contain 4 sardines on average, so the portion sizes were manually converted into standard can units. Specifically, "4 sardines" was converted to 1 standard 5-oz. can and "6 sardines" was converted to 1.5 standard 5-oz. cans. The portion-to-mass conversion procedure was then performed according to the standard can rules.

For the remaining response describing fish sticks, a conversion factor of 0.30 oz. per stick was chosen through consultation with Ridolfi staff and nutritional information from a common fish stick producer.[4]

[4] http://www.cnputah.org/resources/linked/Gortons_fish_product_information.pdf

9.2 Appendix C—Additional Detail on Imputations

9.2.1 Grouping of Species for Imputation of Uncommon Responses

[NPT]
As described in Section 5.28 of the main body of this report, when a component needed to calculate a species-specific consumption rate (portion frequency, portion size or higher consumption period percentage of the year) was missing, similar non-missing responses were used to estimate a mean value for imputation. To be considered similar, a response needed to be for the same species and have the same period type (the types were: whole year, higher consumption period or lower consumption period). This rule was used when the number of similar responses was at least 5. When the number was less than 5, species were grouped to expand the number of similar responses on a case-by-case basis, as described in Table C1. In general, the choice of groupings was restrictive and based on consultation with Ridolfi staff. When high-consumption period percentage was being imputed, the grouping was less restrictive than for size and frequency because the number of available responses was smaller and because the majority of responses were in the range of 8%–33% (1–4 months) across all species. As the sensitivity analysis in the next section shows, the final results are similar under a wide range of imputed values, so the precise value used for the imputation is not critical.

[NPT]
Table C1. Nez Perce Tribe. Species groupings used to impute missing values for uncommon species (less than 5 non-missing responses).

Species in CAPI	Missing Field	No. Imputed	Species group used for Imputation
Other salmon*	Portion frequency	1	Other salmon,* Kokanee, Sockeye, which are less commonly consumed salmon species
Other salmon*	Higher period percentage	1	Other salmon,* Kokanee, Sockeye, which are less commonly consumed salmon species
All trout or unspecified	Higher period percentage	1	All resident trout species/groups
Freshwater clams or mussels	Higher period percentage	2	All freshwater or marine shellfish species
Lobster	Higher period percentage	3	All freshwater or marine shellfish species

*Other salmon is a species category in CAPI that allowed for a specific salmon species not listed to be written in, most commonly pink or Atlantic salmon.

[SBT]
As described in Section 5.28 of the main body of this report, when a component needed to calculate a species-specific consumption rate (portion frequency, portion size or higher consumption period percentage of the year) was missing, similar non-missing responses were used to estimate a mean value for imputation. To be considered similar, a response needed to be for the same species and have the same period type (whole year, higher consumption period or lower consumption period). This rule was used when the number of similar responses was at least 5. When the number was less than 5, species were grouped to expand the number of similar

responses on a case-by-case basis, as described in Table C1 (for imputing portion frequency or size) and Table C2 (for imputing higher period percentage). In general, the choice of groupings was restrictive and based on consultation with Ridolfi. When period percentage was being imputed, the grouping was less restrictive than for size and frequency because the number of available responses was smaller and because the majority of responses were in the range of 8%–33% (1–4 months) across all species. As the sensitivity analysis in the next section shows, the final results are similar under a wide range of imputed values, so the precise value used for the imputation is not critical.

Table C1. Shoshone-Bannock Tribes. Species groupings using to impute missing portion frequency or size for uncommon species (less than 5 non-missing responses).

Species in CAPI	Missing Field	No. Imputed	Group used For Imputation
Marine clams or mussels	Size	2	Freshwater and marine clams or mussels
Whitefish	Size	1	Whitefish; there was only a single non-missing response available (lower period consumption) but a suitable group could not be chosen.

Table C2. Shoshone-Bannock Tribes. Species groupings using to impute higher period percentage for uncommon species (less than 5 non-missing responses).

Species in CAPI	No. Imputed	Group used For Imputation
Other salmon	3	Other salmon*, Kokanee, Sockeye, which are less commonly consumed salmon species
Brown trout	1	Other trout*, bull, brook, lake, and brown trout, which are less commonly consumed trout species
Crayfish, freshwater clams or mussels, marine clams or mussels, crab, shrimp	8	All freshwater or marine shellfish species
Bass, catfish, tilapia, whitefish	4	All freshwater finfish species except salmon, steelhead or resident trout
Cod, halibut, tuna	7	All marine finfish species

*Other salmon and other trout are species categories in CAPI that allowed for a specific salmon or trout species not listed to be written in, for example, pink or Atlantic salmon.

9.2.2 Sensitivity Analysis on Imputations

[NPT]
The impact of imputing missing values in calculating consumption rates was explored by recomputing rates under two extreme approaches: imputing 0 for all missing values, which

would systematically underestimate consumption, and imputing twice the mean value (based on the same species), which in many cases would overestimate consumption. Consumption rates based on alternative imputations for Groups 1-6 are shown in Tables C2-C7, respectively. There was usually little or no difference in the estimates based on the extreme imputation approaches compared to the imputation approach used in the report (imputing the mean value from the same species), with the differences ranging from 0.0-2.6% except for the 90th percentile of Group 5 (Table C6) had a difference of 18.4% between the mean approach and the twice the mean approach. The mean approach is likely to be much more accurate than twice the mean and the difference of 18.4% is not very large compared to the upper bound of the 95% CI (120% higher than the point estimate). These results show that imputation of missing values had a minimal impact on the final consumption rates presented in this report.

[NPT]

Table C2. Nez Perce Tribe. Sensitivity analysis of imputation method on the Group 1 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	451	451	451
Mean	122.1	123.4	123.9
50th percentile	70.2	70.5	71.2
90th percentile	263.8	270.1	270.9
95th percentile	437.3	437.4	437.6
Max	1371.9	1371.9	1371.9

*All missing values were assigned the value 0;

**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[NPT]

Table C3. Nez Perce Tribe. Sensitivity analysis of imputation method on the Group 2 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	446	446	446
Mean	102.8	104.0	104.5
50th percentile	60.1	61.3	62.9
90th percentile	229.5	231.4	233.7

95th percentile	321.8	327.9	326.9
Max	1323.8	1323.8	1323.8

*All missing values were assigned the value 0;
**All missing values were assigned the mean value from the same species;
***All missing values were assigned twice the mean value from the same species.

[NPT]

Table C4. Nez Perce Tribe. Sensitivity analysis of imputation method on the Group 3 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	446	446	446
Mean	77.9	79.0	79.4
50th percentile	45.2	45.2	45.8
90th percentile	166.1	166.1	167.1
95th percentile	244.8	247.3	247.3
Max	949.8	949.8	949.8

*All missing values were assigned the value 0;
**All missing values were assigned the mean value from the same species;
***All missing values were assigned twice the mean value from the same species.

[NPT]

Table C5. Nez Perce Tribe. Sensitivity analysis of imputation method on the Group 4 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	136	136	136
Mean	13.5	13.5	13.5
50th percentile	3.8	3.8	3.8
90th percentile	26.3	26.3	26.3
95th percentile	56.8	56.8	56.8
Max	544.2	544.2	544.2

*All missing values were assigned the value 0;
**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[NPT]

Table C6. Nez Perce Tribe. Sensitivity analysis of imputation method on the Group 5 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	150	150	150
Mean	14.0	14.3	14.6
50th percentile	3.7	3.7	3.7
90th percentile	34.2	34.2	40.5
95th percentile	75.9	75.9	75.9
Max	309.5	309.5	309.5

*All missing values were assigned the value 0;
**All missing values were assigned the mean value from the same species;
***All missing values were assigned twice the mean value from the same species.

[NPT]

Table C7. Nez Perce Tribe. Sensitivity analysis of imputation method on the Group 6 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	308	308	308
Mean	50.8	51.0	51.1
50th percentile	29.8	29.8	29.8
90th percentile	93.3	93.3	93.3
95th percentile	155.4	155.4	155.4
Max	731.8	731.8	731.8

*All missing values were assigned the value 0;
**All missing values were assigned the mean value from the same species;
***All missing values were assigned twice the mean value from the same species.

[SBT]

The impact of imputing missing values in calculating consumption rates was explored by recomputing rates under two extreme approaches: imputing 0 for all missing values, which would systematically underestimate consumption, and imputing twice the mean value (based on the same species), which in many cases would overestimate consumption. Consumption rates for Groups 1-6 are shown in Tables C3-C8, respectively. For Groups 1, 5 and 6, differences between the estimates based on the extreme imputation approaches compared to the imputation approach used in the report (imputing the mean value from the same species) were less than 5% except median rate from Group 5 (difference: 8.3%). For Groups 2-4, the differences between approaches was most often less than 10% and otherwise less than 20% except for the median rate from Group 4 (difference: 21.7%). The mean approach is likely to be much more accurate than twice the mean, which is quite an extreme approach, and the differences seen across these extreme scenarios is smaller than the ranges contained within the 95% CIs. For example, the upper bound of the 95% CI of the Group 4 median rate is 96% higher than the point estimate, compared with the 22% higher estimate based on the twice the mean approach. Most differences across imputation approaches were much smaller than this. These results show that imputation of missing values had a relatively small impact on the final consumption rates presented in this report.

[SBT]

Table C3. Shoshone-Bannock Tribes. Sensitivity analysis of imputation method on the Group 1 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	226	226	226
Mean	155.0	158.5	160.3
50th percentile	74.6	74.6	74.7
90th percentile	392.1	392.5	400.4
95th percentile	603.4	603.4	603.4
Max	1068.2	1068.2	1068.2

*All missing values were assigned the value 0;

**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[SBT]

Table C4. Shoshone-Bannock Tribes. Sensitivity analysis of imputation method on the Group 2 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	225	225	225
Mean	107.5	110.7	112.6
50th percentile	42.2	48.5	49.9
90th percentile	265.6	265.6	310.4
95th percentile	427.1	427.1	427.8
Max	1029.2	1029.2	1029.2

*All missing values were assigned the value 0;

**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[SBT]

Table C5. Shoshone-Bannock Tribes. Sensitivity analysis of imputation method on the Group 3 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	215	215	215
Mean	46.3	47.6	48.7
50th percentile	15.4	15.4	16.7
90th percentile	142.3	142.3	157.7
95th percentile	233.1	233.1	233.1
Max	825.2	825.2	825.2

*All missing values were assigned the value 0;

**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[SBT]

Table C6. Shoshone-Bannock Tribes. Sensitivity analysis of imputation method on the Group 4 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	130	130	130
Mean	19.1	22.1	23.0

50th percentile	3.6	4.6	4.6
90th percentile	56.0	56.0	59.7
95th percentile	68.3	68.3	79.3
Max	374.7	374.7	374.7

*All missing values were assigned the value 0;

**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[SBT]

Table C7. Shoshone-Bannock Tribes. Sensitivity analysis of imputation method on the Group 5 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	97	97	97
Mean	11.1	11.2	11.3
50th percentile	3.6	3.6	3.9
90th percentile	33.7	33.7	33.7
95th percentile	43.5	43.5	43.5
Max	76.1	76.1	76.1

*All missing values were assigned the value 0;

**All missing values were assigned the mean value from the same species;

***All missing values were assigned twice the mean value from the same species.

[SBT]

Table C8. Shoshone-Bannock Tribes. Sensitivity analysis of imputation method on the Group 6 consumption rates. Estimates are weighted.

	Imputation Method		
	Zero*	Mean** (used in report)	High***
No. of consumers	222	222	222
Mean	98.1	98.8	99.2
50th percentile	35.5	37.3	37.3
90th percentile	218.9	221.5	222.2
95th percentile	402.6	402.6	402.6
Max	1019.5	1019.5	1019.5

*All missing values were assigned the value 0;
**All missing values were assigned the mean value from the same species;
***All missing values were assigned twice the mean value from the same species.

9.3 Appendix D—Additional Detailed Tables

[BOTH]
The tables in this appendix supplement tables already included in the body of the report. As shown in Table D1, there were some differences in demographics between the original population, the sample and the consumers reported in the report tables. [SBT] Some of these differences are by design (e.g., oversampling of fishers). [BOTH] The survey weights are designed to account for these differences and produce estimates which are representative of the tribal population from which the sample was drawn.

[NPT]

Table D1. Nez Perce Tribe. Demographics of the eligible population, selected sample and first interview consumers with known consumption rates. Estimates are unweighted.

		Eligible Population (N=1574)			Sample (N=1250)			FFQ Consumer* (N=451)	
Variable		***%***	***N***		***%***	***N***		***%***	***N***
Gender	Male	48.2%	758		48.1%	601		53.4%	241
	Female	51.8%	816		51.9%	649		46.6%	210
Age	18-29 years	23.4%	369		23.4%	293		13.5%	61
	30-39 years	19.4%	305		19.4%	242		20.8%	94
	40-49 years	18.8%	296		18.8%	235		25.7%	116
	50-59 years	18.0%	283		18.0%	225		19.7%	89
	60 years or older	20.4%	321		20.4%	255		20.2%	91
Documented fisher	Yes	23.6%	371		23.0%	288		30.6%	138
	No	76.4%	1203		77.0%	962		69.4%	313
Zip code	83540	57.6%	906		58.3%	729		73.0%	329
	83536	12.4%	196		12.1%	151		8.6%	39
	83501	10.9%	172		10.9%	136		6.2%	28
	Other	19.1%	300		18.7%	234		12.2%	55

*Includes those who completed the first interview and have a calculable non-zero FFQ consumption rate.

[SBT]

Table D1. Shoshone-Bannock Tribes. Demographics of the eligible population, selected sample and first interview consumers with known consumption rates. Estimates are unweighted.

		Eligible Population (N=3242)			Sample (N=661)			FFQ Consumer* (N=226)	
Variable		***%***	***N***		***%***	***N***		***%***	***N***
Gender	Male	48.3%	1566		62.0%	410		63.3%	143
	Female	51.7%	1676		38.0%	251		36.7%	83
Age	18-29 years	30.7%	996		24.5%	162		15.9%	36
	30-39 years	20.8%	673		17.9%	118		17.3%	39
	40-49 years	17.9%	581		20.7%	137		22.6%	51
	50-59 years	14.9%	483		18.6%	123		21.2%	48
	60 years or older	15.7%	509		18.3%	121		23.0%	52
Documented fisher	Yes	9.2%	299		45.2%	299		59.3%	134
	No	90.8%	2943		54.8%	362		40.7%	92
Zip code	83203	84.0%	2723		89.1%	589		91.6%	207
	Other	16.0%	519		10.9%	72		8.4%	19
Live on reservation	Yes	85.9%	2786		90.3%	597		92.9%	210
	No	14.1%	456		9.7%	64		7.1%	16

*Includes those who completed the first interview and have a calculable non-zero FFQ consumption rate.

[NPT]

Table D2. Nez Perce Tribe. Demographics of the first interview consumers with known consumption rates. Estimates are unweighted.

		% or mean ± SD	No. Responded
Gender*	Male	53.4%	451
	Female	46.6%	
Age*	18-29 years	13.5%	451
	30-39 years	20.8%	
	40-49 years	25.7%	
	50-59 years	19.7%	
	60 years or older	20.2%	
Weight, kgs		89.9 ± 19.5	434
Weight, kgs (males only)		95.9 ± 18.8	239
Weight, kgs (females only)		82.6 ± 17.8	195
No. in household	1	8.2%	451
	2	18.6%	
	3-4	42.8%	
	5 or more	30.4%	
Documented fisher*	Yes	30.6%	451
	No	69.4%	
Live on reservation	Yes	87.1%	449
	No	12.9%	
Highest education	Middle school	1.6%	448
	High School / GED	52.5%	
	Associates degree	25.7%	
	Bachelor's degree	14.1%	
	Master's degree	5.6%	
	Doctorate	0.7%	
Annual household income	≤ $15K	19.3%	410
	$15K – $25K	20.7%	
	$25K – $35K	19.8%	
	$35K – $45K	12.9%	
	$45K – $55K	8.3%	
	$55K – $65K	5.6%	
	>$65K	13.4%	

*From the enrollment list or fisher indicator list; other demographics were determined from the questionnaire.

[SBT]

Table D2. Shoshone-Bannock Tribes. Demographics of the first interview consumers with known consumption rates. Estimates are unweighted.

		% or mean ± SD	No. Responded
Gender*	Male	63.3%	226
	Female	36.7%	
Age*	18-29 years	15.9%	226
	30-39 years	17.3%	
	40-49 years	22.6%	
	50-59 years	21.2%	
	60 years or older	23.0%	
Weight, kgs		95.3 ± 24.6	219
Weight, kgs (males only)		101.0 ± 24.7	140
Weight, kgs (females only)		85.1 ± 21.1	79
No. in household	1	12.8%	226
	2	23.9%	
	3-4	38.5%	
	5 or more	24.8%	
Documented fisher*	Yes	59.3%	226
	No	40.7%	
Live on reservation*	Yes	92.9%	226
	No	7.1%	
Highest education	Elementary school	0.9%	223
	Middle school	5.4%	
	High School / GED	62.3%	
	Associates degree	20.6%	
	Bachelor's degree	8.1%	
	Master's degree	2.2%	
	Doctorate	0.4%	
Annual household income	≤ $15K	21.5%	144
	$15K – $25K	16.7%	
	$25K – $35K	9.7%	
	$35K – $45K	16.7%	
	$45K – $55K	13.2%	
	$55K – $65K	9.7%	
	>$65K	12.5%	

*From the enrollment list or fishers; other demographics were determined from the questionnaire.

[NPT]

Table D3. Nez Perce Tribe. Estimated distribution of consumption rates (g/day) of consumers within demographic subgroups. All rates are for total consumption (group 1). Estimates are weighted. Mean, SD, median ('50%') and percentiles.

	No. of			Percentiles									
Group	Consumers*	Mean	SD	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
Gender**													
Male	241	146.6	179.3	87.4	101.0	119.7	133.3	148.8	168.7	191.3	223.6	285.1	488.3
Female	210	100.2	133.1	54.7	64.1	70.9	81.8	105.3	116.3	133.1	155.1	244.0	341.4
Age**													
18-29 years	61	126.7	175.4	74.7	84.2	102.0	109.5	123.1	126.2	148.3	190.7	225.2	522.4
30-39 years	94	140.9	161.1	74.0	84.9	112.8	132.7	148.1	164.8	185.9	243.2	298.9	448.6
40-49 years	116	115.4	126.1	68.5	78.2	85.9	95.5	114.8	130.8	150.4	194.5	241.2	463.3
50-59 years	89	130.3	193.4	67.4	76.6	88.6	107.2	136.1	150.0	184.6	212.8	253.8	308.2
60 years or older	91	105.8	136.8	62.3	71.0	76.4	101.9	113.2	129.4	143.9	207.5	264.8	332.0
Documented Fisher**													
Yes	138	171.8	207.2	98.0	108.6	125.7	156.1	177.5	203.2	228.5	283.9	436.8	543.5
No	313	107.9	137.5	65.5	70.6	81.1	98.8	113.4	132.5	147.7	178.1	232.9	337.7
Live on reservation													
Yes	391	127.3	164.4	70.6	77.9	88.9	112.4	131.4	148.4	177.6	222.5	284.6	451.0
No	58	106.5	134.4	65.6	95.0	106.2	108.9	110.8	123.2	128.1	152.7	202.8	237.5
Number who live in household													
1	37	133.9	179.3	82.0	93.0	108.9	113.8	131.8	135.9	147.9	243.1	288.3	***423.0
2	84	119.0	144.1	57.2	65.5	82.1	103.5	136.3	179.1	202.4	240.0	285.3	451.5
3-4	193	119.3	163.7	71.0	78.4	88.0	105.7	117.1	125.9	144.9	175.8	224.3	441.0
5 or more	137	129.2	158.0	74.0	83.1	100.0	113.7	133.1	155.8	176.3	201.1	284.0	381.1
Highest education													
High school / GED or less	242	126.6	176.5	70.4	79.5	96.9	109.1	123.0	134.8	156.2	190.8	253.9	492.0
Associates degree or higher	206	120.4	136.5	70.7	78.6	89.8	113.3	134.3	151.9	185.3	211.0	275.0	409.0
Annual household income													
≤ $15K	79	122.9	168.7	69.7	74.0	97.2	105.8	125.8	135.4	159.9	204.0	282.4	324.9
$15K – $45K	219	126.6	165.9	71.1	79.3	89.4	107.1	121.2	136.4	156.7	208.5	250.8	488.7
>$45K	112	117.7	113.5	72.4	78.9	97.1	122.8	135.9	155.7	174.1	215.5	244.8	339.6

*Consumers with unknown or missing subgroup status were excluded for the analysis of that subgroup;

**From the enrollment list or fisher indicator list; other subgroups were determined from the questionnaire;

***Two or fewer expected respondents with rates equal or greater than the reported percentile (approximately); interpret this percentile more cautiously.

[SBT]

Table D3. Shoshone-Bannock Tribes. Estimated distribution of consumption rates (g/day) of consumers within demographic subgroups. All rates are for total consumption (group 1). Estimates are weighted. Mean, SD, median ("50%") and percentiles.

	No. of			Percentiles									
Group	Consumers*	Mean	SD	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
Gender**													
Male	143	187.3	245.5	74.9	136.2	155.1	174.0	199.8	231.7	313.2	335.9	452.2	806.0
Female	83	134.4	184.5	65.8	82.9	90.7	102.2	110.6	122.9	231.6	248.0	313.6	467.7
Age**													
18-29 years	36	181.9	266.6	61.0	65.2	73.2	83.8	200.1	236.4	292.6	364.2	456.1	***653.4
30-39 years	39	197.1	272.4	81.8	93.4	107.1	126.2	171.4	209.1	308.8	326.9	498.5	***873.9
40-49 years	51	113.5	122.9	69.6	97.2	106.5	112.5	151.8	165.3	177.4	229.9	237.1	287.9
50-59 years	48	157.2	169.1	119.7	128.3	154.5	163.9	230.5	232.8	233.7	283.4	298.5	606.2
60 years or older	52	119.6	142.1	74.2	74.9	88.0	91.4	108.4	136.3	136.4	183.9	412.5	452.1
Documented Fisher**													
Yes	134	160.9	169.8	117.7	130.8	147.1	168.8	185.8	198.1	228.5	285.2	351.1	459.1
No	92	158.2	221.4	69.7	76.0	93.7	116.3	146.0	204.4	233.7	311.2	405.4	604.4
Live on reservation													
Yes	210	163.1	223.4	74.7	90.7	107.8	128.0	157.1	229.9	235.5	309.4	384.4	620.7
No	16	126.7	151.5	57.3	69.9	80.2	94.2	134.5	157.6	169.8	231.1	***389.6	***426.5
Number who live in household													
1	29	120.0	152.0	41.2	45.7	49.2	151.0	155.0	172.4	176.0	236.1	335.5	***429
2	54	197.4	239.6	105.4	118.5	143.1	230.6	232.4	233.5	263.4	412.1	465.7	659.3
3-4	87	182.2	235.4	94.0	108.8	120.0	135.2	161.7	229.2	282.6	339.8	435.6	605.4
5 or more	56	119.1	187.4	52.1	62.6	64.3	69.8	82.9	110.4	187.8	235.0	308.0	317.2
Highest education													
High school / GED or less	153	174.6	237.1	77.2	91.7	116.3	134.9	160.1	230.4	281.5	337.5	453.3	647.9
Associates degree or higher	70	124.6	148.7	56.5	69.4	91.7	109.2	134.0	188.2	230.5	257.0	306.3	330.4
Annual household income													
≤ $15K	31	134.0	145.6	76.6	91.1	113.1	161.1	171.9	209.2	239.6	273.2	302.3	***422.5

$15K – $45K	62	153.6	234.2	66.4	74.8	76.9	90.2	105.8	116.9	129.1	348.8	424.6	584.4
>$45K	51	173.4	159.3	118.3	143.6	155.8	205.0	226.8	233.0	307.1	317.2	333.0	495.2

*Consumers with unknown or missing subgroup status were excluded for the analysis of that subgroup;
**From the enrollment list or fishers list; other subgroups were determined from the questionnaire;
***Two or fewer expected respondents with rates equal or greater than the reported percentile (approximately); interpret this percentile more cautiously.

[NPT]

Table D4. Nez Perce Tribe. Enumeration of household clusters. Respondent IDs within each cluster are comma separated. See section 5.25 on confidence intervals for a discussion on impact.

Cluster ID	PMR IDs
1	E1AIO, EAIT1
2	E1P63, ESFBV
3	E33P9, EM176
4	E3P73, EO63E
5	E3XBE, EJ9K1
6	E4NEO, EREES
7	E58XO, EEMQQ
8	E5RHK, EQ8BI
9	E65IH, EB452
10	E6CQ2, E6P1W
11	E6PAI, ET8FX
12	E6YG0, EC0DT
13	E7EJ6, EC0UR
14	E8AMB, ESM4S
15	E8HEK, EXY46
16	E8RLC, EDPQA
17	EA4VL, EIOXT
18	EB478, EVD86
19	EBT5B, EGRJP
20	EC8V1, EFQQ4
21	EESW7, EYSWS
22	EFE4A, EWQB2
23	EH21Q, ESDK7
24	EHAK0, EMWSN
25	EOIID, EV2MI
26	EPULA, EZRSR
27	ETTSY, EWQ7T
28	E11X9, E6HY0, EOL5S
29	E1Q8I, ETWDT, EX2ND
30	E2OJH, E5LMF, EJ2V7
31	E4OTM, E6URJ, EQBA2
32	EB3TX, EQ3Y5, EZE8V
33	EDKUW, EDVWP, EIDIO
34	EQGKA, ER9Y3, EY40I

35	E389E, E4WM7, ELXWI, EPIWP, EU22B

[SBT]

Table D4. Shoshone-Bannock Tribes. Enumeration of household clusters. Respondent IDs within each cluster are comma separated. See section 5.25 on confidence intervals for a discussion on impact.

Cluster ID	PMR IDs
1	K16UN, KJPSC
2	K9XL2, K9Y80
3	KM0H7, KM1J5
4	KAP9F, KAPCS
5	K00WJ, K019Q
6	KLJD3, KLLH1
7	K75MG, K7734
8	KLJ8O, KLJEL
9	K5KG5, K5NCE
10	KB048, KDLO6
11	K2PM8, K2Q1X
12	K2XPP, KI8JA, KI8OC

9.4 Appendix E—Expanded Tables and Additional Notes on the NCI Method

The tables in this section provide additional percentiles and other statistics of fish consumption rates. Selected values in these tables have been presented in the Results section of this report.

[NPT]

Table E1. Nez Perce Tribe. Distribution of the usual fish group 1 consumption based on the 24 hour recalls. Estimated by the NCI method.

	N	*mean*	*p5*	*p10*	*p15*	*p20*	*p25*	*p30*	*p35*	*p40*	*p45*	*p50*	*p55*	*p60*	*p65*	*p70*	*p75*	*p80*	*p85*	*p90*	*p95*
Overall	451	75.0	7.3	11.2	15.1	19.2	23.5	27.8	32.5	37.7	43.3	49.5	56.4	64.6	73.9	85.1	98.9	115.7	138.5	173.2	232.1
Documented fisher																					
Fisher	138	98.2	9.4	14.8	20.1	25.2	30.9	36.7	42.7	49.3	56.3	64.7	74.3	85.2	97.9	113.2	130.4	154.1	184.1	229.2	305.0
Non-fisher	313	67.6	6.8	10.5	14.0	17.7	21.7	25.8	30.2	34.6	39.9	45.6	52.0	59.2	67.9	77.6	90.0	104.9	124.6	155.1	206.0
Gender																					
Men	241	87.7	9.1	14.0	18.8	23.6	28.4	33.4	39.1	44.8	51.3	58.4	66.7	76.3	87.2	99.8	115.3	134.1	161.9	199.8	268.1
Women	210	62.3	6.1	9.5	12.5	15.9	19.5	23.5	27.3	31.7	36.5	41.8	47.7	54.4	62.4	71.6	82.8	97.7	116.0	145.1	194.4
ZIP Code																					
83540	329	73.6	7.0	10.9	14.7	18.7	22.8	27.2	31.8	36.9	42.3	48.2	55.1	62.7	72.1	83.2	96.4	113.1	135.5	168.1	227.2
83536	39	84.5	8.7	13.1	17.6	23.0	27.8	32.8	38.5	44.2	50.8	58.1	67.4	77.4	88.9	101.5	117.6	136.2	164.2	197.9	246.9
83501	28	63.6	7.4	11.2	14.8	19.3	23.7	27.7	32.4	37.0	42.3	48.4	54.5	60.8	67.9	75.2	85.6	98.4	115.8	139.4	177.7
NP Other	55	79.8	7.2	11.0	15.0	19.0	23.2	26.9	31.7	36.8	42.6	49.2	56.8	65.9	76.5	88.8	102.7	120.7	148.8	193.8	264.2
Age																					
18-29	61	75.3	8.4	12.4	17.0	21.4	25.8	30.7	35.1	40.5	46.5	52.0	58.6	66.1	74.7	85.5	97.8	114.3	137.0	170.1	232.5
30-39	94	92.5	10.8	16.5	21.8	27.2	31.8	37.2	43.0	49.4	56.2	64.5	73.1	83.1	94.9	108.5	124.4	143.7	171.2	207.7	274.2
40-49	116	83.8	9.3	13.7	18.1	22.9	27.2	32.2	37.9	43.5	49.9	56.6	64.0	73.1	83.6	97.4	112.5	129.9	157.0	192.6	256.3
50-59	89	66.8	5.8	9.1	12.3	15.4	19.0	22.6	26.5	30.8	35.8	41.2	46.8	54.0	62.0	71.4	83.3	98.0	118.4	151.4	212.7
60+	91	58.1	5.4	8.2	11.0	13.8	16.9	20.5	24.1	28.3	33.0	37.7	43.0	49.6	57.3	67.6	77.7	92.9	110.5	136.5	182.5

[SBT]

Table E1. Shoshone-Bannock Tribes. Distribution of the usual fish group 1 consumption based on the 24 hour recalls. Estimated by the NCI method.

	N	*mean*	*p5*	*p10*	*p15*	*p20*	*p25*	*p30*	*p35*	*p40*	*p45*	*p50*	*p55*	*p60*	*p65*	*p70*	*p75*	*p80*	*p85*	*p90*	*p95*
Overall	226	34.9	1.2	2.0	3.0	4.0	5.2	6.5	8.0	9.9	12.2	14.9	18.3	22.3	27.6	33.7	41.9	53.4	69.2	94.5	140.9
Documented fisher																					
Fisher	134	42.4	1.7	2.9	4.2	5.5	7.0	8.8	11.1	13.6	16.6	20.0	24.4	29.7	35.9	43.6	53.6	67.0	84.6	114.3	163.6
Non-fisher	92	33.9	1.1	1.9	2.8	3.8	5.0	6.2	7.7	9.4	11.6	14.4	17.6	21.5	26.6	32.7	40.4	51.6	67.1	91.8	138.3
Gender																					
Men	143	38.1	0.9	1.7	2.5	3.5	4.7	6.0	7.6	9.8	12.5	15.7	20.0	25.4	30.8	37.5	46.7	58.3	76.5	103.8	158.3
Women	83	32.2	1.4	2.3	3.3	4.4	5.5	6.8	8.2	9.9	11.9	14.4	17.3	20.6	25.2	31.1	38.3	48.6	62.3	85.6	126.8
ZIP Code																					
83203	207	29.9	1.1	1.9	2.7	3.6	4.7	5.7	7.1	8.5	10.3	12.7	15.4	19.0	23.1	28.3	35.3	44.0	57.4	79.2	121.1
SB Other	19	59.2	2.0	3.8	5.9	8.8	11.5	14.5	18.2	23.2	29.5	33.4	40.0	47.8	56.6	67.7	79.5	96.9	118.7	151.0	209.7
Age																					
18-29	36	24.3	0.8	1.2	1.8	2.3	3.0	3.7	4.6	5.4	6.4	7.6	9.1	10.9	13.6	17.6	23.8	31.3	42.5	62.9	110.2
30-39	39	44.6	2.7	4.1	5.7	7.7	9.6	12.1	15.2	18.1	21.3	25.6	30.2	35.2	40.7	48.9	57.9	70.9	88.2	113.4	159.0
40-49	51	51.7	2.2	3.6	5.0	6.6	8.3	10.3	12.7	15.5	18.5	23.2	28.2	34.5	42.5	53.7	67.1	85.6	108.6	147.4	202.5
50-59	48	31.8	0.9	1.3	2.0	2.8	3.8	5.1	6.7	8.9	10.9	14.0	17.3	20.7	25.5	32.2	40.6	52.1	65.6	88.9	125.8
60+	52	26.8	1.5	2.5	3.4	4.6	5.7	7.1	8.5	10.5	12.5	14.6	17.0	20.6	24.7	29.7	34.4	42.1	51.9	67.8	90.7

[NPT]

Table E2. Nez Perce Tribe. Distribution of the usual fish group 2 consumption based on the 24 hour recalls. Estimated by the NCI method.

	N	*mean*	*p5*	*p10*	*p15*	*p20*	*p25*	*p30*	*p35*	*p40*	*p45*	*p50*	*p55*	*p60*	*p65*	*p70*	*p75*	*p80*	*p85*	*p90*	*p95*
Overall	446	66.5	4.1	6.8	9.4	12.2	15.1	18.3	21.9	26.1	30.8	36.0	42.1	49.5	58.0	68.7	81.7	98.2	121.8	159.4	233.9
Documented fisher																					
Fisher	138	98.4	7.3	11.6	15.8	20.0	24.6	29.8	35.1	40.8	47.7	55.2	64.8	75.4	86.3	101.8	121.9	146.9	181.5	238.6	345.0
Non-fisher	308	55.6	3.9	6.4	8.8	11.2	13.8	16.6	19.7	23.2	27.4	32.0	37.0	43.2	50.8	59.4	70.6	84.1	102.2	132.0	189.5
Gender																					
Men	240	79.4	5.3	8.7	11.8	15.2	18.7	22.7	27.2	32.2	37.5	44.0	51.4	60.1	70.3	81.8	96.4	116.7	144.6	190.4	277.1
Women	206	55.0	3.0	5.1	7.2	9.4	11.8	14.4	17.4	20.5	24.5	29.0	34.0	39.8	47.5	56.3	67.9	82.7	102.8	135.6	198.0
ZIP Code																					
83540	326	65.5	3.8	6.3	8.8	11.4	14.3	17.4	20.8	24.8	29.6	34.7	40.6	48.2	56.7	67.0	80.2	97.0	120.7	158.4	232.3
83536	38	83.7	4.8	8.0	11.0	14.6	18.2	22.7	27.9	33.3	39.7	46.6	54.8	63.8	74.8	88.9	104.3	129.6	162.4	219.2	301.5
83501	27	64.0	5.1	8.4	11.7	15.0	18.6	22.5	26.5	31.0	36.0	41.6	48.0	54.3	64.6	75.6	87.6	104.8	123.3	150.6	197.4
NP Other	55	63.0	3.8	6.3	8.5	10.8	13.1	15.9	19.2	22.4	26.1	30.2	36.4	43.0	51.3	60.0	72.2	87.9	112.8	150.0	231.3
Age																					
18-29	61	76.9	9.1	13.4	17.6	21.2	25.1	29.4	33.2	38.5	43.4	49.4	56.6	64.2	72.5	82.5	93.7	108.4	130.3	167.0	249.4
30-39	94	83.7	10.5	15.1	19.5	23.2	27.4	31.7	36.6	41.6	46.9	53.1	61.0	69.2	79.0	90.4	104.0	122.5	147.6	189.0	262.8
40-49	115	65.1	8.8	12.8	16.2	19.7	23.1	26.6	30.2	34.7	38.8	43.6	48.9	54.9	62.5	71.1	81.7	95.0	114.2	142.8	196.6
50-59	88	55.2	5.3	8.0	10.5	13.0	15.5	18.5	21.8	25.3	29.4	33.8	38.3	43.6	49.9	57.7	67.5	80.4	96.9	122.1	173.0
60+	88	50.4	5.5	8.2	10.6	13.1	15.6	18.3	21.0	24.4	28.0	31.7	36.1	41.0	47.0	54.4	63.4	73.5	89.3	111.6	153.9

[SBT]

Table E2. Shoshone-Bannock Tribes. Distribution of the usual fish group 2 consumption based on the 24 hour recalls. Estimated by the NCI method.

	N	*mean*	*p5*	*p10*	*p15*	*p20*	*p25*	*p30*	*p35*	*p40*	*p45*	*p50*	*p55*	*p60*	*p65*	*p70*	*p75*	*p80*	*p85*	*p90*	*p95*
Overall	225	18.6	0.4	0.7	1.1	1.6	2.1	2.6	3.4	4.2	5.2	6.5	8.0	10.0	12.5	15.6	20.0	25.6	34.1	48.9	80.0
Documented fisher																					
Fisher	134	23.3	0.3	0.8	1.4	2.2	3.1	4.1	5.4	6.7	8.3	10.2	12.5	15.4	18.8	22.8	28.0	35.3	45.5	61.5	92.6
Non-fisher	91	17.8	0.4	0.7	1.1	1.5	2.0	2.6	3.3	4.1	5.1	6.3	7.7	9.6	12.1	15.0	19.0	24.5	32.8	46.6	76.8
Gender																					
Men	143	18.0	0.3	0.5	0.8	1.2	1.6	2.1	2.7	3.4	4.4	5.5	6.9	8.9	11.2	14.2	18.7	24.7	33.9	49.6	79.4
Women	82	19.5	0.5	0.8	1.3	1.7	2.3	2.9	3.7	4.5	5.6	6.9	8.4	10.4	13.1	16.2	20.2	25.6	34.1	48.2	84.3
ZIP Code																					
83203	206	15.8	0.3	0.7	1.0	1.4	1.9	2.4	3.0	3.7	4.6	5.6	6.9	8.4	10.4	12.8	16.3	20.8	28.0	39.7	67.2
SB Other	19	34.1	0.6	1.2	1.8	2.8	3.8	4.9	6.8	9.2	11.4	14.3	19.2	23.9	28.4	34.5	42.1	53.7	67.4	90.2	130.7
Age																					
18-29	36	1.3	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.8	1.0	1.3	1.7	2.2	3.1	5.4
30-39	39	36.5	0.6	1.5	3.1	5.5	7.6	9.8	12.1	14.4	16.9	19.8	23.0	27.4	33.1	38.9	46.7	56.8	70.7	93.0	136.3
40-49	51	50.9	1.4	2.4	3.4	4.4	5.6	7.2	9.2	12.2	15.5	19.8	25.9	33.9	42.7	53.6	65.4	81.0	102.8	140.9	203.0
50-59	48	12.6	0.1	0.2	0.4	0.5	0.6	0.8	1.0	1.4	1.9	2.6	3.8	5.9	8.5	11.8	15.7	21.1	27.0	37.5	55.2
60+	51	13.1	0.2	1.0	1.6	2.3	2.8	3.5	4.4	5.3	6.4	7.5	8.8	10.3	12.4	14.5	17.0	20.2	24.7	31.9	45.1

[NPT] Table E3. Nez Perce Tribe. Distribution of the usual fish group 1 consumption and their 95% confidence intervals based on the 24 hour recalls. Estimated by the NCI method.

	N	*mean*	*p05*	*p10*	*p15*	*p20*	*p25*	*p30*	*p35*	*p40*	*p45*
Overall											
	451	75.0	7.3	11.2	15.1	19.2	23.5	27.8	32.5	37.7	43.3
(95% CI)		(57.3-104.6)	(1.5-18.5)	(3.0-24.0)	(4.7-29.3)	(6.7-34.4)	(9.1-38.8)	(11.8-44.0)	(14.8-48.6)	(18.5-54.0)	(22.6-60.7)
Fisher											
	138	98.2	9.4	14.8	20.1	25.2	30.9	36.7	42.7	49.3	56.3
(95% CI)		(66.3-158.3)	(1.8-32.2)	(3.8-39.9)	(6.1-47.9)	(8.4-55.8)	(11.1-62.6)	(14.4-69.9)	(18.5-77.6)	(23.1-86.4)	(28.0-96.0)

--continued

	p50	*p55*	*p60*	*p65*	*p70*	*p75*	*p80*	*p85*	*p90*	*p95*
Overall										
	49.5	56.4	64.6	73.9	85.1	98.9	115.7	138.5	173.2	232.1
(95% CI)	(27.8-67.8)	(33.8-76.1)	(41.0-86.5)	(49.5-97.5)	(59.0-111.6)	(69.9-133.5)	(82.9-161.2)	(97.8-200.1)	(120.9-262.3)	(165.0-379.7)
Fisher										
	64.7	74.3	85.2	97.9	113.2	130.4	154.1	184.1	229.2	305
(95% CI)	(32.8-106.5)	(38.6-121.0)	(45.9-137.9)	(54.8-159.1)	(65.1-184.2)	(78.2-218.7)	(91.1-257.7)	(112.9-316.1)	(141.4-401.6)	(196.7-540.3)

[SBT] Table E3. Shoshone-Bannock Tribes. Distribution of the usual fish group 1 consumption and their 95% confidence intervals based on the 24 hour recalls. Estimated by the NCI method.

	N	*mean*	*p05*	*p10*	*p15*	*p20*	*p25*	*p30*	*p35*	*p40*	*p45*
Overall											
	226	34.9	1.2	2.0	3.0	4.0	5.2	6.5	8.0	9.9	12.2
(95% CI)		(20.6-66.2)	(0.0-3.4)	(0.0-5.0)	(0.1-6.7)	(0.2-8.8)	(0.4-11.1)	(0.8-14.0)	(1.2-16.5)	(1.7-19.9)	(2.4-24.0)
Fisher											
	134	42.4	1.7	2.9	4.2	5.5	7	8.8	11.1	13.6	16.6
(95% CI)		(23.7-84.6)	(0.0-6.1)	(0.2-8.4)	(0.4-10.9)	(0.8-14.0)	(1.2-17.2)	(2.0-20.8)	(3.0-25.0)	(4.1-28.9)	(5.5-33.7)

--continued

	p50	*p55*	*p60*	*p65*	*p70*	*p75*	*p80*	*p85*	*p90*	*p95*
Overall										
	14.9	18.3	22.3	27.6	33.7	41.9	53.4	69.2	94.5	140.9
(95% CI)	(3.4-28.9)	(4.7-33.4)	(6.9-39.8)	(9.3-48.8)	(13.1-62.0)	(18.0-80.2)	(25.4-105.8)	(35.6-140.2)	(52.6-199.8)	(82.0-312.9)
Fisher										
	20	24.4	29.7	35.9	43.6	53.6	67	84.6	114.3	163.6
(95% CI)	(7.3-39.1)	(9.3-46.9)	(12.2-55.8)	(15.7-68.3)	(20.5-81.8)	(27.1-104.5)	(34.7-132.4)	(43.4-174.5)	(56.6-238.3)	(83.6-376.2)

9.4.1 NCI Method—Covariate Selection

[BOTH]
This section expands on the selection of covariates into the NCI models described in section 5.23.2 "The NCI Method—Covariate Selection." That section described two steps for selecting the covariates into the NCI models: (1) the choice of the FFQ covariate adjustment; and (2) the inclusion of other covariates. The other candidate covariates included: presence on the fishers list, gender, ZIP code groups (83540, 83536, 83501 and Other for the Nez Perce Tribe; 83203 and Other for the Shoshone-Bannock Tribes), age (grouped as 18–29, 30–39, 40–49, 50–59 and 60+) and the responder's weight (in pounds). Prior to these two steps we also assessed potential seasonality in the 24-hour recall data.

We first present covariate selection for the species Group 1 NCI model.

Figure E1 shows the survey-weighted mean of the 24-hour recall by tribe, month and interview number (1st vs. 2nd interview). The 1st and 2nd interviews are separated because we found important differences between them (the 2nd interview tended to be higher, on average, than those in the first interview). Means for some of the months have very small sample sizes (the sample size is shown within each dot). The sample sizes are limited and there is large variability of the 24-hour recall data across time: no clear seasonal trend is apparent. We do not claim that such a trend does not exist, but that a trend was not empirically evident from the data. With fewer single and double hits than the NPT, the trend lines for the SBT do not suggest a trend.. Although some of the months appear to have lower consumption rates, on the average (e.g., July and August 2014 for NPT), this could be an artifact of the small sample size. And, while other months seem to be high in a specific group (e.g., November for 1st interviews in NPT), these trends are not strongly supported by the other interviews (e.g., the 2nd interview for the NPT November mean) or across tribes. Because of the lack of empirical evidence for seasonal differences in the 24-hour recalls for Group 1, species seasonality was ignored in the NCI models for Group 1.

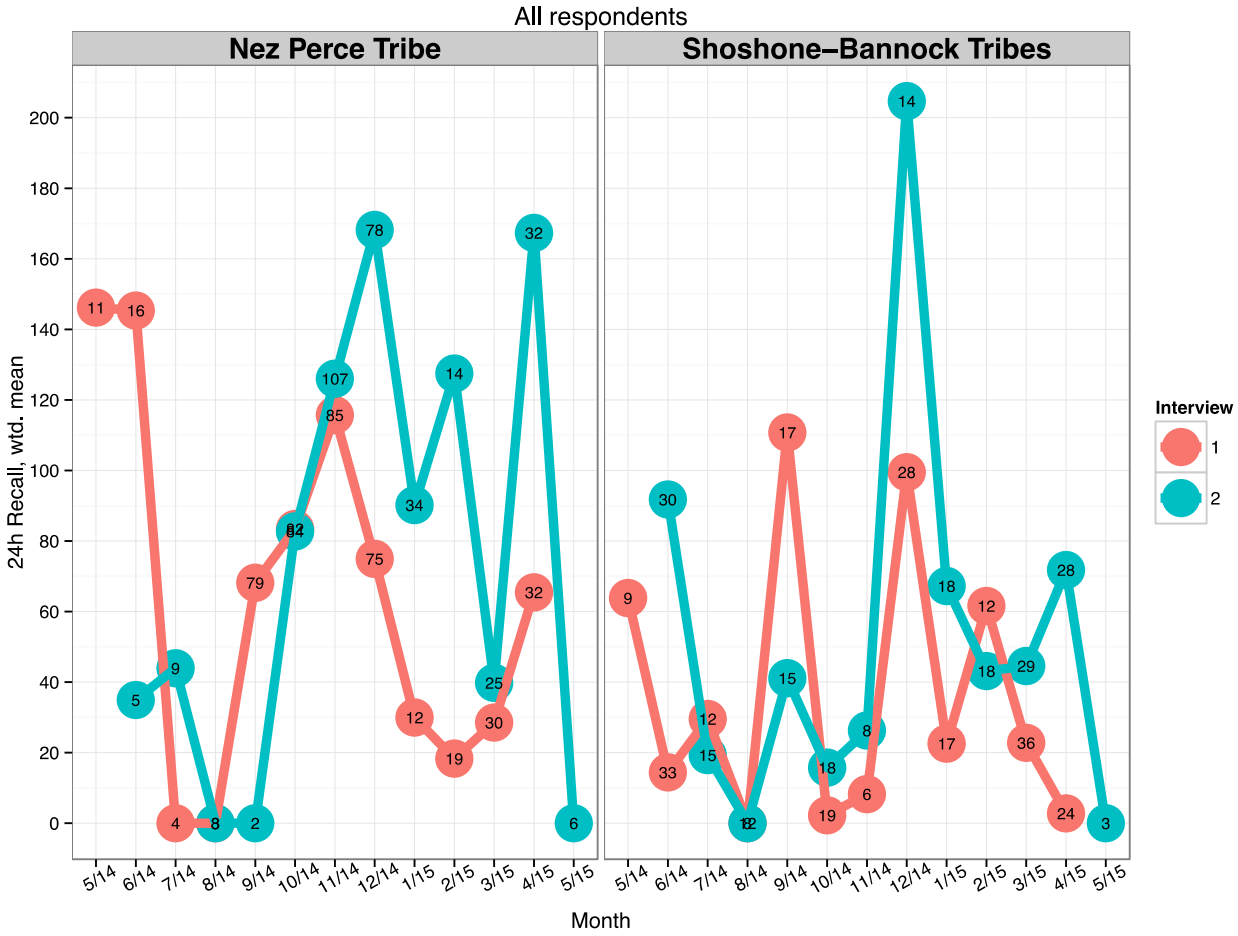


Figure E1. Mean 24-hour recall for species Group 1 by tribe, month and interview number (1st or 2nd 24-hour recall interview). Numbers within each month's dot are the sample size. One very large data point for a single NPT second interview during May (5/14) was excluded from this seasonal analysis.

Next we considered four forms of continuous FFQ covariate adjustment: the original (untransformed) FFQ rate value, the 3rd root value, the $\log_{10}$ value and the numerical decile of FFQ (coded as 1-10[5]). Each of these forms was accompanied in the model by its interaction with the tribe to allow different effects in the two tribes. The goodness-of-fit of the four FFQ forms was compared to the model with the categorical FFQ decile by calculating statistics for respondents divided into the ten decile groups per tribe. Specifically, the mean, median, 90th percentile and 95th percentile of consumption were calculated by the NCI method within each decile of FFQ for each of the four forms, and were compared to the same statistics (means and percentiles) calculated by a fifth NCI model that used the FFQ decile as a categorical variable. Although the categorical decile model need not necessarily reveal the "best" relationship between FFQ and 24-hour recalls (due to noise in the data and other possible relationships), the categorical model is a useful reference because it can reveal potential non-linear trends in the relationship. In choosing between the four continuous FFQ adjustments we sought to find a transformation of FFQ that would reasonably follow the trend suggested by the categorical decile model and lead to a good, simple characterization of the relationship between FFQ and the 24-hour recalls. The categorical decile model also suggested another adjustment that we previously did not expect. We discovered that the 24h recall consumption in the 10th FFQ decile among the SBT respondents was considerably lower than expected by the trend in any of the four forms of FFQ. We therefore added an indicator for this group into each model, which greatly improved the fit. The impact of the 10th SBT decile is further described in the following paragraph.

The comparison of the four FFQ forms of covariate adjustments to the categorical FFQ adjustment is shown in Figure E2. The eight panels of the figure show the fit for the two tribes (the first four panels for NPT and the second four panels for SBT), all calculated from an NCI model based on data combined form the two Tribes . The four panels for each tribe show the estimated mean, the 50th, 90th and 95th percentiles (in that order). The estimates from the reference categorical decile model are shown as black bars and the estimates from the four considered FFQ forms are superimposed as colored lines. The categorical estimates show that in the NPT, the NCI-estimated usual intake estimated from the 24-hour recalls increased with higher FFQ deciles. This, however, was not the case in the SBT, where the estimated intake decreased after the 8th decile. While the decrease from the 8th decile to the 9th decile was relative moderate, the decrease from the 8th decile to the 10th decile was pronounced. We therefore introduced an indicator for the 10th SBT decile (but not for the 9th SBT decile) into the model. The impact of this indicator is also illustrated in Table E4, which shows the NCI model coefficients for 10 different models: (1) the four continuous forms of FFQ with the indicator for SBT decile 10; (2) the four continuous forms of FFQ without the indicator for SBT decile 10; (3) the model with the categorical FFQ decile; and (4) the model without FFQ. The coefficient A_VAR_U2 shows the between-person variance, in the transformed positive amount, not explained by the covariates. The similar values of the coefficients lambda (A_LAMBDA) across the models suggests that the transformations of the amount consumed are similar across the 10 models (ranging from 0.25 to 0.32) and, thus, the variances are approximately comparable (larger differences would suggest different amount scales and a lack of comparability of the other model coefficients). The model without FFQ (the last column) has A_VAR_U2 equal to 6.09. As this model has no FFQ adjustment, the unexplained between-person variance is large. Importantly, the models with the SBT decile 10 indicator variable have A_VAR_U2 values between 0.91 and 2.55 whereas the models without it have much larger A_VAR_U2 values (ranging between 2.78 and 6.12). The difference in A_VAR_U2 shows the ability of the SBT decile 10 to explain differences in the amount variation across respondents.

Figure E2 and Table E4 help us to choose between the four forms of continuous FFQ adjustment. The untransformed FFQ and numerical FFQ decile models have much larger A_VAR_U2 than the 3rd root and $\log_{10}$

[5] The decile cut points were defined separately within each tribe.

FFQ models. Visually, the untransformed FFQ model tends to overestimate the intake for the bottom two FFQ deciles and the 10^{th} decile, and to underestimate the intake for the FFQ deciles 5-9 in SBT (with the exception of decile 10). The model with numerical FFQ deciles tends to overestimate the intake for FFQ deciles 7 and 8 in NPT. The fits for the 3^{rd} root and $\log_{10}$ FFQ models are similar visually as well as in terms of their A_VAR_U2 values. The choice between these two models was therefore arbitrary. We used the 3^{rd} root of FFQ as our primary choice because the 3^{rd} root transformation is numerically very close to the transformation of the positive 24-hour recalls in this model (lambda of 0.33 corresponds to the third root). With the 3^{rd} root of FFQ, the FFQ predictor and the transformed 24-hour recall values are approximately on the same scale. To investigate the impact of this choice, we ran a sensitivity analysis with $\log_{10}$ FFQ as the form for the FFQ variable and compared the results to the primary choice of the 3^{rd} root of FFQ. The results of this sensitivity analysis are presented in this appendix.

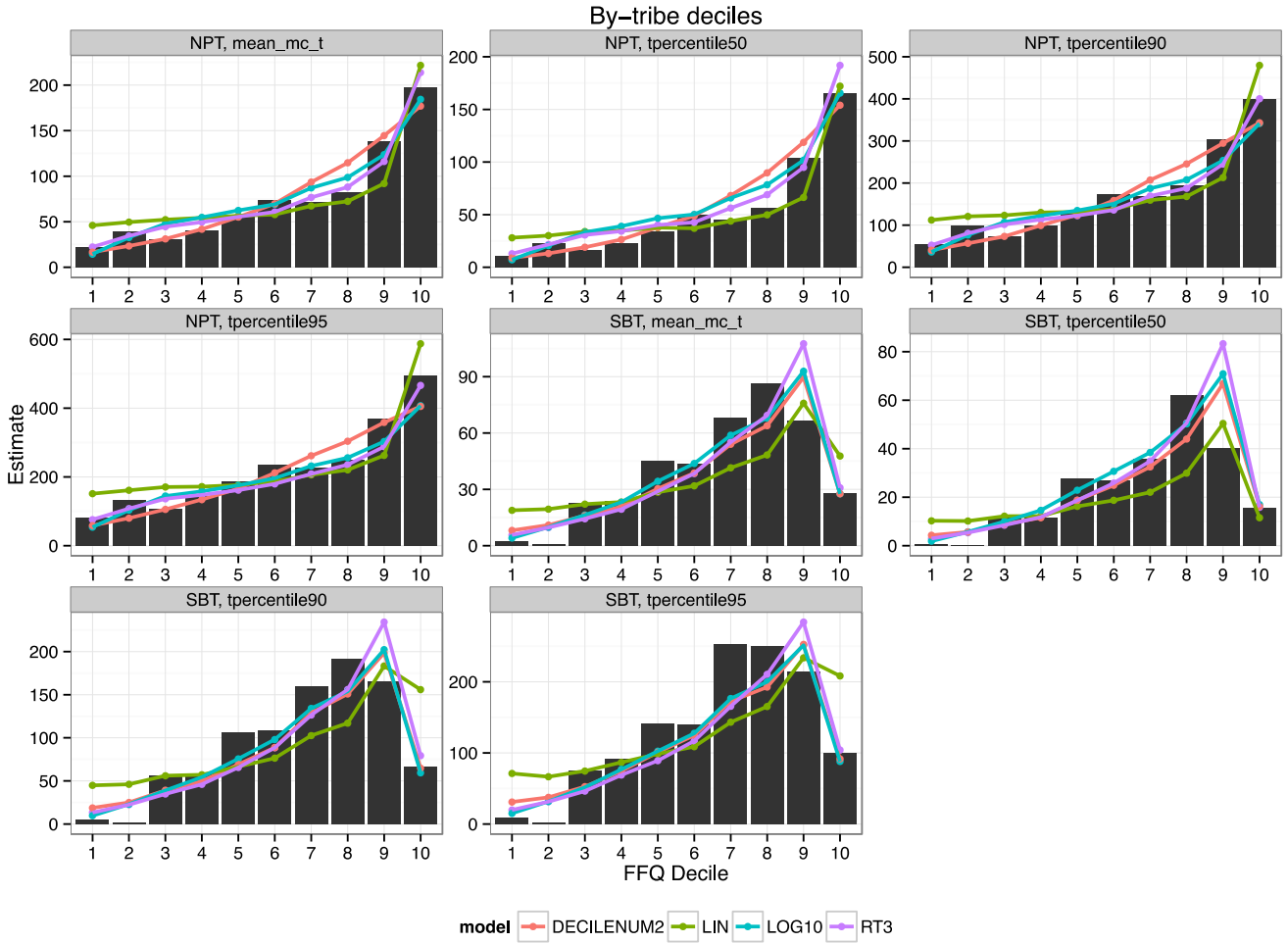


Figure E2. Comparison of four forms of FFQ adjustment (colored lines) to the categorical decile FFQ adjustment (black bars). Model for Group 1 species. DECILENUM2 = the numerical decile of FFQ (coded as 1-10), LIN = the original (untransformed) FFQ, LOG10 = the $\log_{10}$ FFQ, RT3 = the 3rd root FFQ. All models included an addition adjustment for the 10th decile in the SBT. mean_mc_t = mean, tpercentile50, 90 and 95 = the 50th, 90th and 95th percentiles, respectively.

Table E4. Coefficients for the NCI models considered in the selection of the FFQ covariate form. Model for Group 1 species. Only selected coefficients are presented for the reference model with categorical decile of FFQ ("Cat. FFQ") and for the model with no FFQ (i.e., model with tribe only).

	Models with indicator for 10th decile in SBT				**Models without indicator for 10th decile in SBT**					
	FFQ model as linear function of				*FFQ model as linear function of*					
	Orig. FFQ	*3rd root of FFQ*	*Log FFQ*	*FFQ Decile*	*Orig. FFQ*	*3rd root of FFQ*	*Log FFQ*	*FFQ Decile*	*Cat. FFQ*	*No FFQ*
A01_INTERCEPT	13.9559	10.3166	8.0985	10.7239	13.0141	10.2516	8.0091	11.1414		
A02_TRIBE	-1.5858	-3.7307	-3.3414	-0.2963	-0.485	-0.0059	-1.0845	-0.5927		
<A03_FFQ variable>	0.006336	0.6543	0.8374	0.5618	0.007474	0.8504	1.1147	0.5113		
<A04_Tribe*FFQ interaction>	0.007179	0.6377	0.6002	-0.02219	-0.00503	-0.286	-0.03819	-0.05807		
A05_SBT_DEC10	-9.0943	-6.6204	-4.1483	-4.0528						
A06_WEEKEND	-0.9247	-0.7346	-0.4761	-0.9493	-1.2819	-1.2208	-0.8656	-1.0534		
A07_SECINT	0.8183	0.846	0.5661	1.0871	1.2293	1.3213	1.0724	1.2909		
A_LAMBDA	**0.3117**	**0.283**	**0.2467**	**0.3**	**0.3163**	**0.3156**	**0.2864**	**0.3074**	**0.2504**	**0.2956**
A_LOGSDE	1.3783	1.2269	1.006	1.3037	1.3682	1.3839	1.2245	1.3473		
A_LOGSDU2	0.407	0.02313	-0.04887	0.4687	0.9056	0.7576	0.5107	0.6819		
P01_INTERCEPT	-1.9953	-3.4115	-4.2844	-3.0236	-1.9964	-3.4485	-4.3217	-2.7742		
P02_TRIBE	-0.8803	-1.2198	-1.0185	-0.615	-0.6906	-0.2404	-0.155	-0.77		
<P03_FFQ variable>	0.003719	0.4265	0.6466	0.2804	0.003724	0.4326	0.6516	0.2413		
<P04_Tribe*FFQ interaction>	0.000153	0.08232	0.03917	-0.01308	-0.0024	-0.1727	-0.1923	-0.01529		
P05_ SBT _DEC10	-2.1493	-2.0507	-1.3541	-1.1575						
P06_WEEKEND	-0.1348	-0.07827	-0.04341	-0.04868	-0.1743	-0.1089	-0.09914	-0.1101		
P07_SECINT	0.5072	0.4915	0.4825	0.4907	0.5132	0.484	0.4936	0.4897		
P_LOGSDU1	0.179	0.07796	0.03015	0.07674	0.1934	0.1392	0.1122	0.1205		
Z_U	0.5427	0.5503	0.5118	0.5889	1.1695	1.1138	1.02	1.1021		
P_VAR_U1	1.4304	1.1687	1.0622	1.1659	1.4721	1.3211	1.2515	1.2726	1.0642	1.625
A_VAR_U2	**2.2571**	**1.0473**	**0.9069**	**2.5533**	**6.1181**	**4.5502**	**2.7772**	**3.9107**	**1.8615**	**6.0925**
A_VAR_E	15.7464	11.6335	7.4788	13.565	15.4315	15.9229	11.5756	14.8004	6.7362	12.0332
cov_u1u2	0.8895	0.554	0.4626	0.9129	2.4733	1.9746	1.4353	1.7875	1.3851	2.7027
RHO	0.4951	0.5008	0.4713	0.5291	0.8241	0.8054	0.7699	0.8012	0.9841	0.859

Estimated parameters: Parameters starting with the letters "A" and "P" refer to the amount and probability models, respectively. A01_INTERCEPT and P01_INTERCEPT= intercept;

A02_TRIBE and P02_TRIBE = tribe (NPT=0, SBT=1);
<A03_FFQ variable> and <P03_FFQ variable>= the (untransformed or transformed) FFQ;
<A04_Tribe*FFQ interaction> and <P04_Tribe*FFQ interaction> = the tribe-FFQ interaction;
A05_SBT_DEC10 and P05_ SBT_DEC10 = indicator of 10th decile in SBT (0=no,1= yes);
A06_WEEKEND and P06_WEEKEND = weekend indicator (0=no,1= yes);
A07_SECINT and P07_SECINT= 2nd interview (0=no,1= yes);
A_LAMBDA = lambda for the Box-Cox transformation of the consumed amount;
A_LOGSDE = log SD of the residual variance;
A_LOGSDU2 and P_LOGSDU1= log SD of the between-subject variance;
Z_U = the Fisher's transformation of the correlation parameter;
P_VAR_U1 = the between-subject variance for the probability model (U1);
A_VAR_U2 = the between-subject variance for the amount model (U1);
A_VAR_E = the residual variance for the amount model;
cov_u1u2 = covariance between U1 and U2;
RHO = the correlation parameter between U1 and U2.

After adding the 3rd root of FFQ and its interaction with the dichotomous tribe variable and the indicator for SBT decile 10 into the model, the next step considered inclusion of the remaining covariates into the model. These candidate covariates included the presence on the fishers list, gender, ZIP code groups (83540, 83536, 83501 and Other for the Nez Perce Tribe and 83203 and Other for the Shoshone-Bannock Tribes), age (grouped as 18–29, 30–39, 40–49, 50–59 and 60+) and the responders' weight (attempted as untransformed, 3rd root, $\log_{10}$ and the numerical decile, coded 1-10). These covariates were included in the model along with their interactions with the tribe.

For the categorical covariates (all covariates except the responders' weight), we calculated the NCI-estimated mean and percentiles and compared them across the groups of the covariate. The results are shown in Figures E3–E6. All four covariates showed an impact on the Group 1 consumption. Specifically, fishers tended to consume more (Figure E3), women less (Figure E4), and respondents in the other SBT ZIP codes more than in the ZIP code 83203 and respondents in the NPT ZIP code 83501 less than in the remaining three NPT ZIP codes (Figure E5). We also observed differences in age for both tribes. Going from younger age groups (left) to older groups (right), consumption first increased and then decreased (Figure E6).

Respondents' weight (attempted as untransformed, 3rd root, $\log_{10}$ and the numerical decile) was analyzed in a fashion similar to the FFQ covariate (Figure E7). There seems to be no or, at best, a weak relationship between the respondents' weight and the 24-hour recall. Respondents' weight was therefore not included in the final model.

The selected covariates were used as covariates in both the probability and the amount equations of the NCI model. The coefficients for the final model for Group 1 are presented in Table E5. In addition to the coefficients for the selected covariates, the output shows coefficients for the weekend adjustment, the sequence effect adjustment and the variance components. Documentation of the parameters can be found in the user's guide for the NCI model macros (Ruth Parsons, Stella S. Munuo, Dennis W. Buckman, Janet A. Tooze, Kevin W. Dodd. User's Guide for Analysis of Usual Intakes. 2009. http://appliedresearch.cancer.gov/diet/usualintakes/Users_Guide_Mixtran_Distrib_Indivint_1.1.pdf)

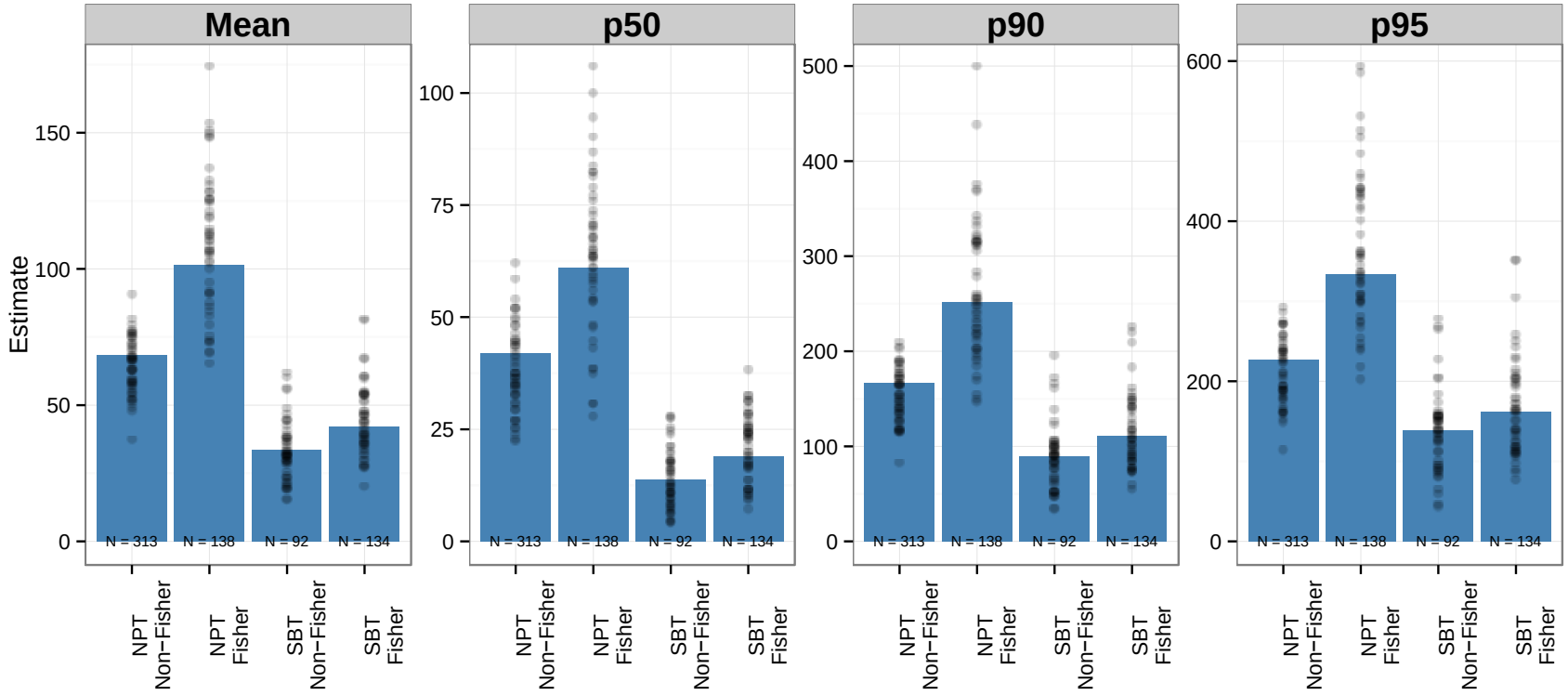


Figure E3. NCI-estimated mean and the 50th, 90th and 95th percentiles by the presence on the fishers list and tribe. Model for Group 1 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for SBT decile 10. Dots are estimates from 50 bootstrap runs and give some idea of uncertainty around the estimates.

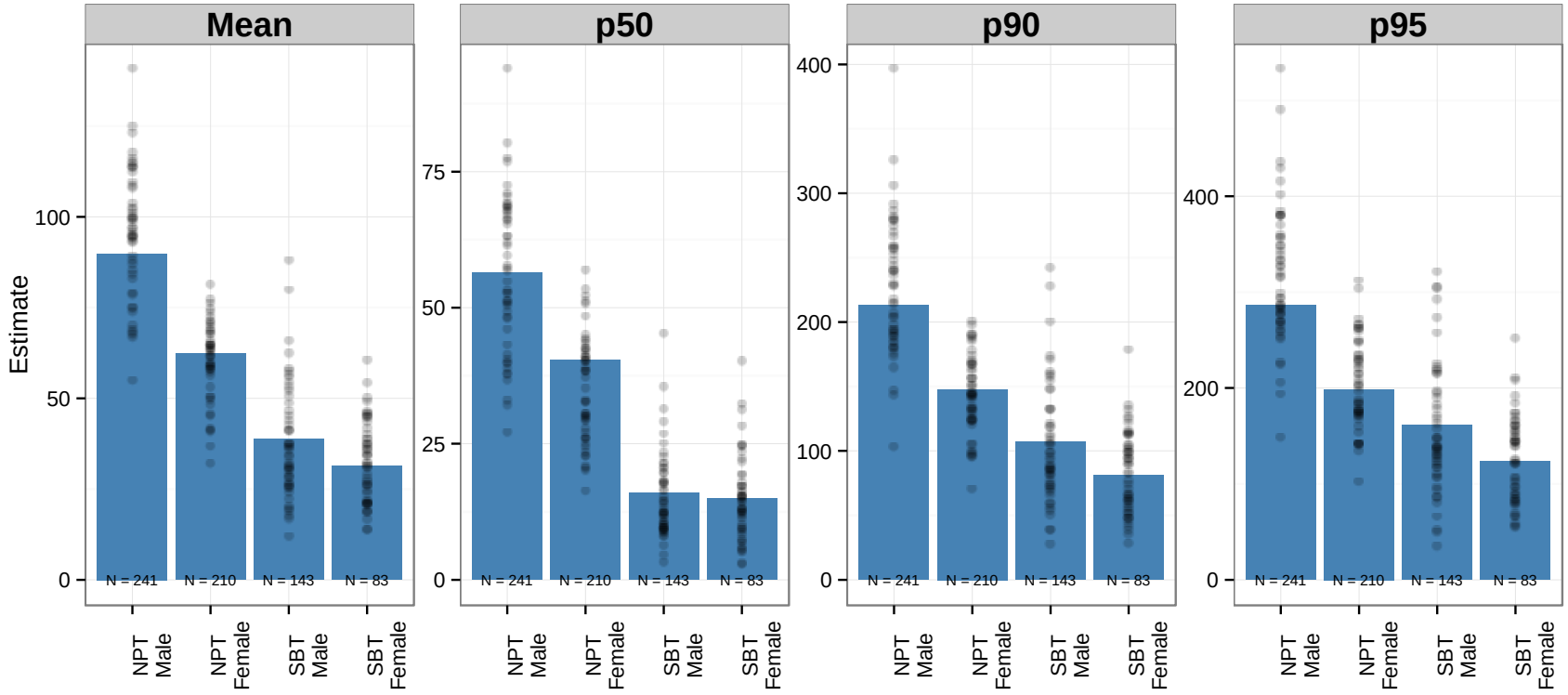


Figure E4. NCI-estimated mean and the 50th, 90th and 95th percentiles by gender and tribe. Model for Group 1 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for SBT decile 10. Dots are estimates from 50 bootstrap runs and give some idea of uncertainty around the estimates.

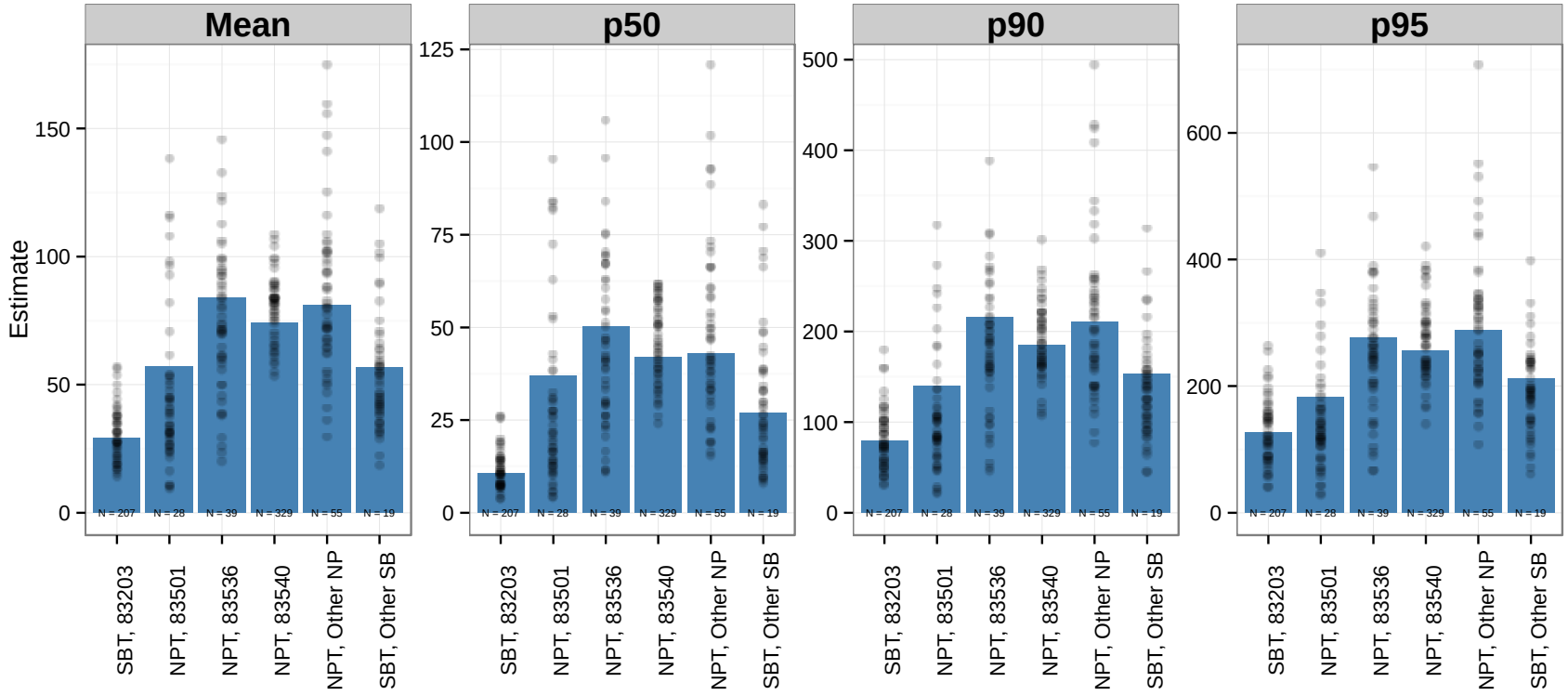


Figure E5. NCI-estimated mean and the 50th, 90th and 95th percentiles by ZIP code. Model for Group 1 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for SBT decile 10. Dots are estimates from 50 bootstrap runs and give some idea of uncertainty around the estimates.

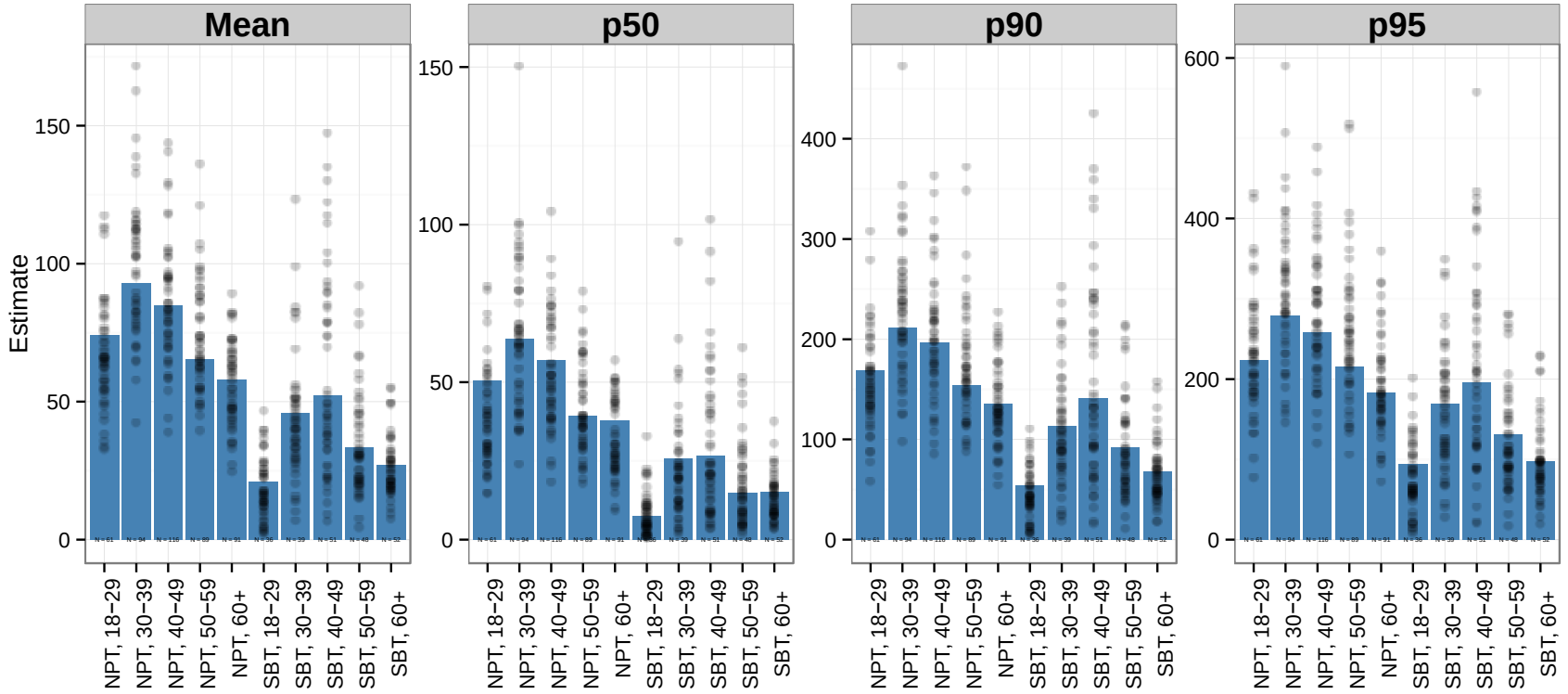


Figure E6. NCI-estimated mean and the 50th, 90th and 95th percentiles by age and tribe. Model for Group 1 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for SBT decile 10. Dots are estimates from 50 bootstrap runs and give some idea of uncertainty around the estimates.

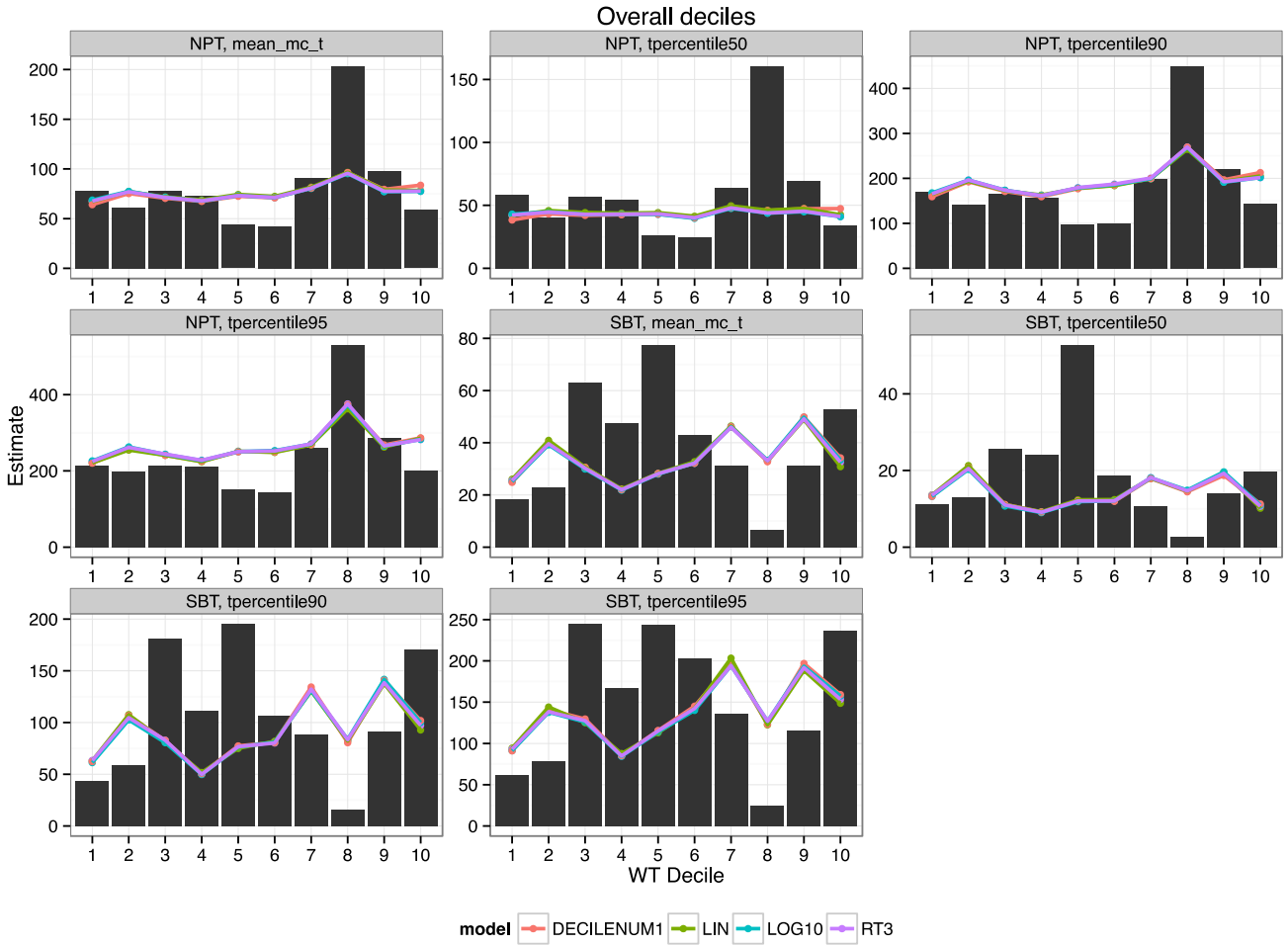


Figure E7. Comparison of four forms of respondent weight adjustment (color lines) to the categorical decile respondent weight adjustment (black bars). Model for Group 1 species. DECILENUM2 = the numerical decile of respondent weight (coded as 1-10), LIN = the original (untransformed) respondent weight, LOG10 = the $\log_{10}$ respondent weight, RT3 = the 3rd root respondent weight. Models include an adjustment for FFQ. mean_mc_t = mean, tpercentile50, 90 and 95 = the 50th, 90th and 95th percentiles, respectively.

Table E5. Final model NCI for Group 1.

Term	*Estimate*	*Term*	*Estimate*
A01_INTERCEPT	11.3909	P01_INTERCEPT	-3.3335
A02_TRIBE	-3.76	P02_TRIBE	-2.2826
A03_ROOT3FFQ	0.5626	P03_ROOT3FFQ	0.4529
A04_TRIBEROOT3FFQ	0.8751	P04_TRIBEROOT3FFQ	0.07145
A05_TRIBEFFQ_GROUP_ALL_GPD_DECX10	-7.9413	P05_TRIBEFFQ_GROUP_ALL_GPD_DECX10	-2.1986
A06_FISHER	0.4883	P06_FISHER	-0.2079
A07_FISHERTRIBE	0.7557	P07_FISHERTRIBE	0.2321
A08_FEMALE	-1.5451	P08_FEMALE	0.2951
A09_FEMALETRIBE	1.5025	P09_FEMALETRIBE	-0.08841
A10_ZIPGROUP83536	-0.2356	P10_ZIPGROUP83536	0.2814
A11_ZIPGROUP83501	0.01798	P11_ZIPGROUP83501	0.06362
A12_ZIPGROUPNPOTHER	0.04987	P12_ZIPGROUPNPOTHER	-0.3446
A13_ZIPGROUPSBOTHER	1.6268	P13_ZIPGROUPSBOTHER	0.7921
A14_AGEGROUP1	1.185	P14_AGEGROUP1	-0.138
A15_AGEGROUP2	1.9248	P15_AGEGROUP2	-0.3214
A16_AGEGROUP3	0.7249	P16_AGEGROUP3	-0.4385
A17_AGEGROUP4	0.3805	P17_AGEGROUP4	-0.3371
A18_AGEGROUP1TRIBE	-3.4037	P18_AGEGROUP1TRIBE	1.3651
A19_AGEGROUP2TRIBE	-2.0021	P19_AGEGROUP2TRIBE	1.0734
A20_AGEGROUP3TRIBE	-2.8827	P20_AGEGROUP3TRIBE	0.8447
A21_AGEGROUP4TRIBE	-1.9345	P21_AGEGROUP4TRIBE	1.3002
A22_WEEKEND	-0.9696	P22_WEEKEND	-0.05227
A23_SECINT	0.7675	P23_SECINT	0.48
A_LAMBDA	0.289	P_LOGSDU1	-0.03087
A_LOGSDE	1.2507	Z_U	0.5493
A_LOGSDU2	-4.669	P_VAR_U1	0.9401
		A_VAR_U2	0.000088
		A_VAR_E	12.1995
		cov_u1u2	0.004549
		RHO	0.5

Estimated parameters: Parameters starting with the letters “A” and “P” refer to the amount and probability models, respectively.

A01_INTERCEPT and P01_INTERCEPT= intercept;
A02_TRIBE and P02_TRIBE = tribe (NPT=0, SBT=1);
A03_ROOT3FFQ and P03_ROOT3FFQ = the (untransformed or transformed) FFQ;
A04_TRIBEROOT3FFQ and P04_TRIBEROOT3FFQ = the tribe-FFQ interaction;
A05_TRIBEFFQ_GROUP_ALL_GPD_DECX10 and P05_TRIBEFFQ_GROUP_ALL_GPD_DECX10 = indicator of 10th decile in SBT (0=no,1= yes);
A06_FISHER and P06_FISHER = on the fishers list (0=no,1= yes);
A07_FISHERTRIBE and P07_FISHERTRIBE = on the fishers list and SBT (0=no,1= yes);
A08_FEMALE and P08_FEMALE = female (0=no,1= yes);
A09_FEMALETRIBE and P09_FEMALETRIBE = SBT female (0=no,1= yes);

A10_ZIPGROUP83536 and P10_ZIPGROUP83536 = ZIP = 83538 (0=no,1= yes);
A11_ZIPGROUP83501 and P11_ZIPGROUP83501 = ZIP = 83501 (0=no,1= yes);
A12_ZIPGROUPNPOTHER and P12_ZIPGROUPNPOTHER = NPT but not ZIP 83538 or 83501 (0=no,1= yes);
A13_ZIPGROUPSBOTHER and P13_ZIPGROUPSBOTHER = SBT but not ZIP 83203 (0=no,1= yes);
A14_AGEGROUP1 and P14_AGEGROUP1 = age 30-39 (0=no,1= yes);
A15_AGEGROUP2 and P15_AGEGROUP2 = age 40-49(0=no,1= yes);
A16_AGEGROUP3 and P16_AGEGROUP3 = age 50-59 (0=no,1= yes);
A17_AGEGROUP4 and P17_AGEGROUP4 = age 60+ (0=no,1= yes);
A18_AGEGROUP1TRIBE and P18_AGEGROUP1TRIBE = age 30-39 and SBT (0=no,1= yes);
A19_AGEGROUP2TRIBE and P19_AGEGROUP2TRIBE = age 40-49 and SBT(0=no,1= yes);
A20_AGEGROUP3TRIBE and P20_AGEGROUP3TRIBE = age 50-59 and SBT (0=no,1= yes);
A21_AGEGROUP4TRIBE and P21_AGEGROUP4TRIBE = age 60+ and SBT (0=no,1= yes);
A22_WEEKEND and P22_WEEKEND = weekend indicator (0=no,1= yes);
A23_SECINT and P23_SECINT= 2nd interview (0=no,1= yes);
A_LAMBDA = lambda for the Box-Cox transformation of the consumed amount;
A_LOGSDE = log SD of the residual variance;
A_LOGSDU2 and P_LOGSDU1= log SD of the between-subject variance;
Z_U = the Fisher's transformation of the correlation parameter;
P_VAR_U1 = the between-subject variance for the probability model (U1);
A_VAR_U2 = the between-subject variance for the amount model (U1);
A_VAR_E = the residual variance for the amount model; cov_u1u2 = covariance between U1 and U2;
RHO = the correlation parameter between U1 and U2.

We ran a similar covariate selection for the Group 2 NCI model.

Figure E8 shows the survey-weighted mean of the 24 hour recall by tribe, month and interview number (1st vs. 2nd interview). The conclusions for the seasonal effects in Group 2 consumption are similar to those for Group 1 (Figure E1) in that no clear seasonal trends were identified.

Figure E9 shows comparison of the four forms of FFQ adjustment (the original (untransformed) value, the 3rd root value, the $\log_{10}$ value and the numerical decile of FFQ). In this case, the FFQ was the FFQ for the Group 2 species to correspond to the Group 2 outcome. As in the group 1 model addition of the indicator for the SBT decile 10 improved the model greatly and the 3rd root and $\log_{10}$ transformations lead to the best fit among the four forms of continuous FFQ. The 3rd root transformation more closely corresponded to the lambda from the NCI model and was thus used as the primary choice while the $\log_{10}$ transformation was used in the sensitivity analysis.

Similar to group 1, the presence on the fishers list (Figure E10), gender (Figure E11), ZIP code (Figure E12) and age (Figure E13) had an important impact on the group 2 consumption while the impact of the respondents' weight was weak (Figure E14). We attempted to add all of the important covariates into the final NCI model for group 2 consumption. However, the model coefficients were unstable. The instability was a consequence of a small number of "hits" in the SBT data, and the model could not clearly separate the independent effects of some of the covariates. To obtain a more stable model we used the model FFQ and tribe adjustments only as the final NCI model for group 2 (Table E6). The additional covariates (such as the presence on the fishers list) were introduced into the model only when needed (i.e. when specific subgroup estimates of consumption were needed). For example, the gender covariate was added when gender-specific distributions were estimated.

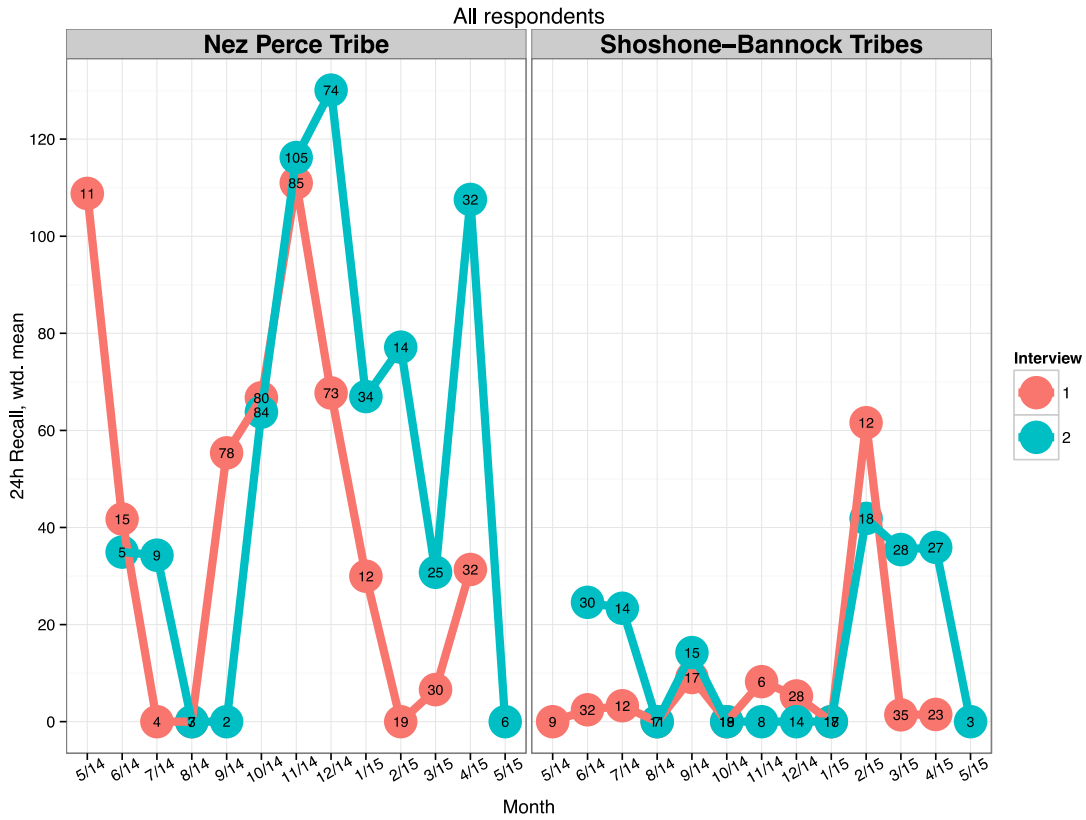


Figure E8. Mean 24-hour recall for species group 2 by tribe, month and interview number. Numbers within each month's dot are the sample size. One outlier data point for a single NPT second interview during May (5/14) was excluded.

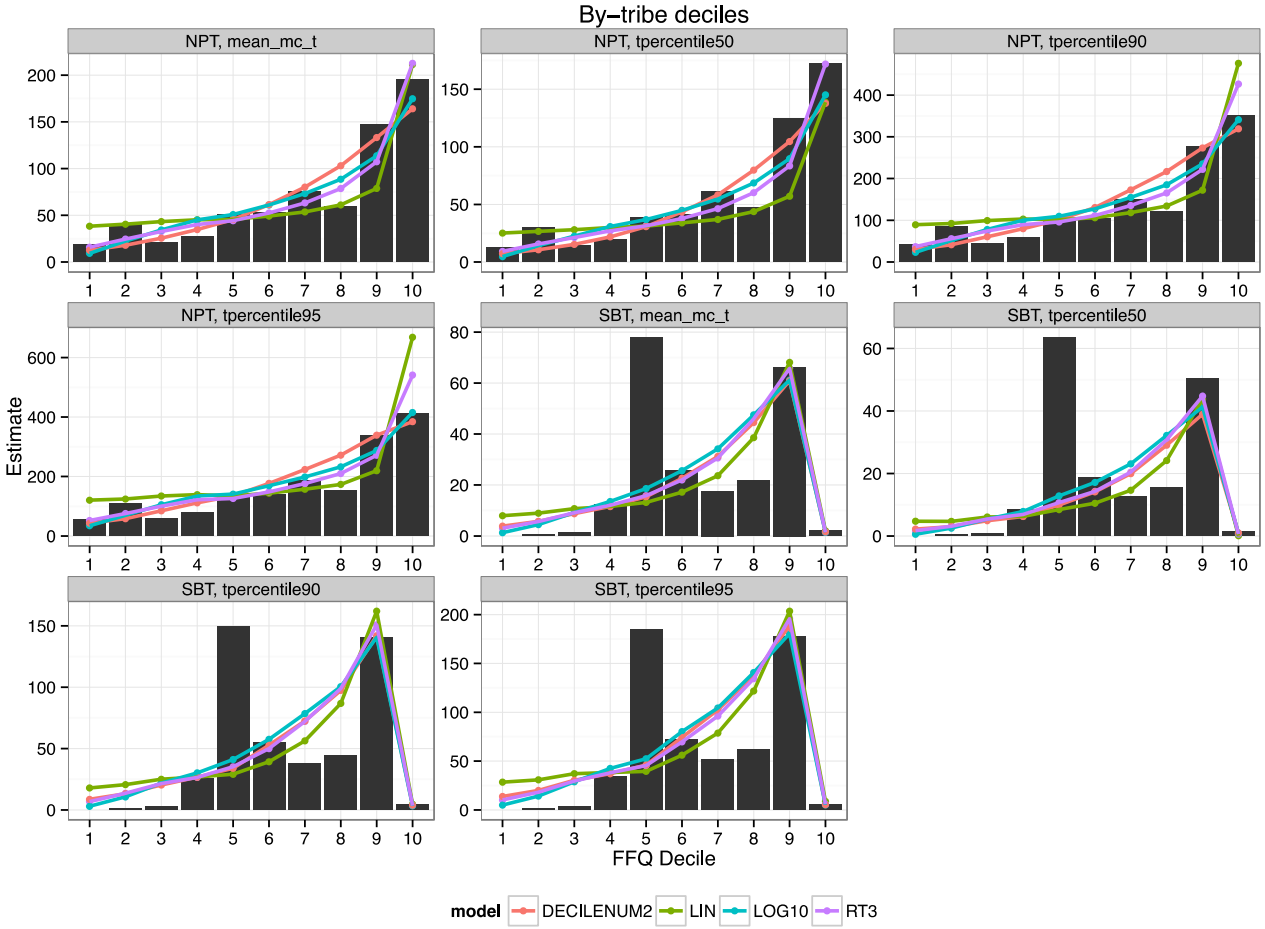


Figure E9. Comparison of four forms of FFQ adjustment (colored lines) to the categorical decile FFQ adjustment (black bars). Model for group 2 species. DECILENUM2 = the numerical decile of FFQ (coded as 1-10), LIN = linear—the original (untransformed) FFQ, LOG10 = the $\log_{10}$ FFQ, RT3 = the 3rd root FFQ. All models included an addition adjustment for the 10th decile in SBT. mean_mc_t = mean, tpercentile50, 90 and 95 = the 50th, 90th and 95th percentiles, respectively.

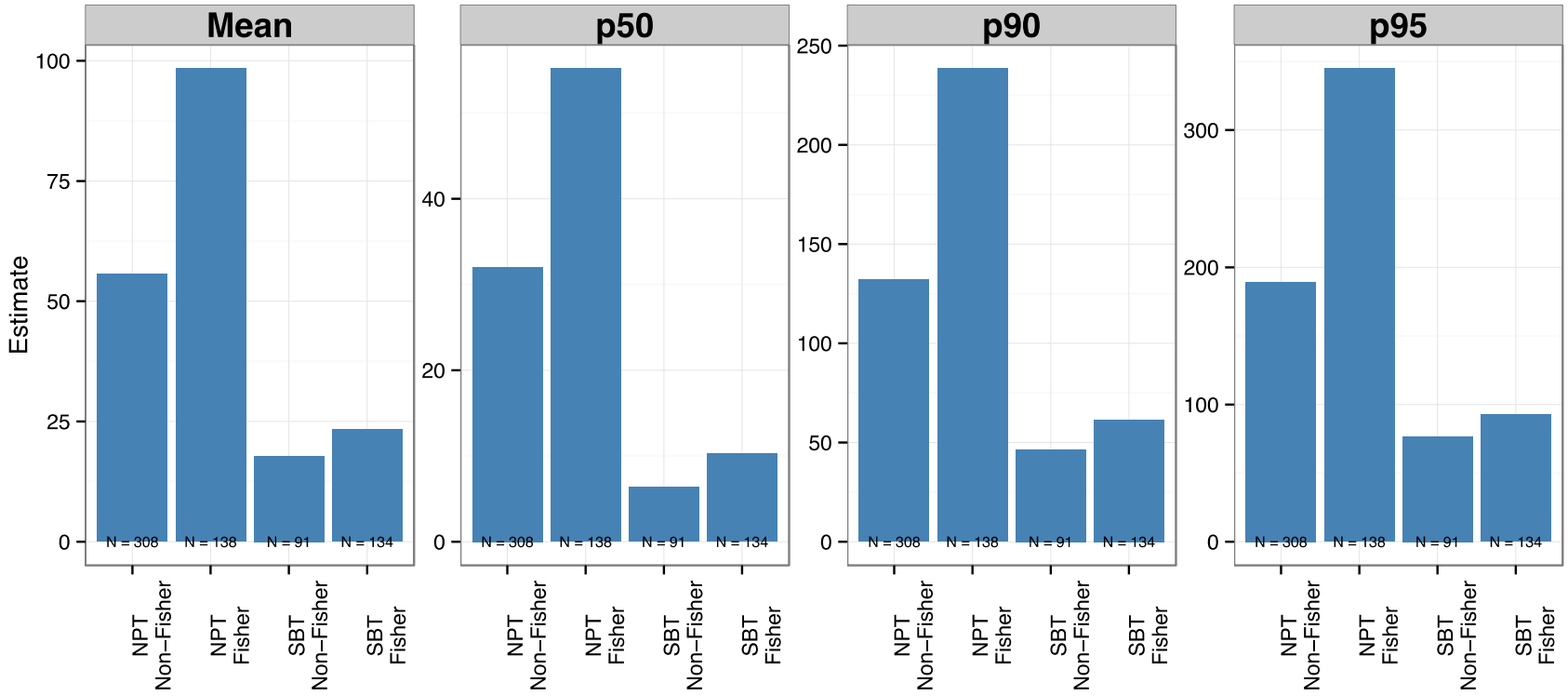


Figure E10. NCI-estimated mean and the 50th, 90th and 95th percentiles by the presence on the fishers list and tribe. Model for group 2 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for the SBT decile 10.

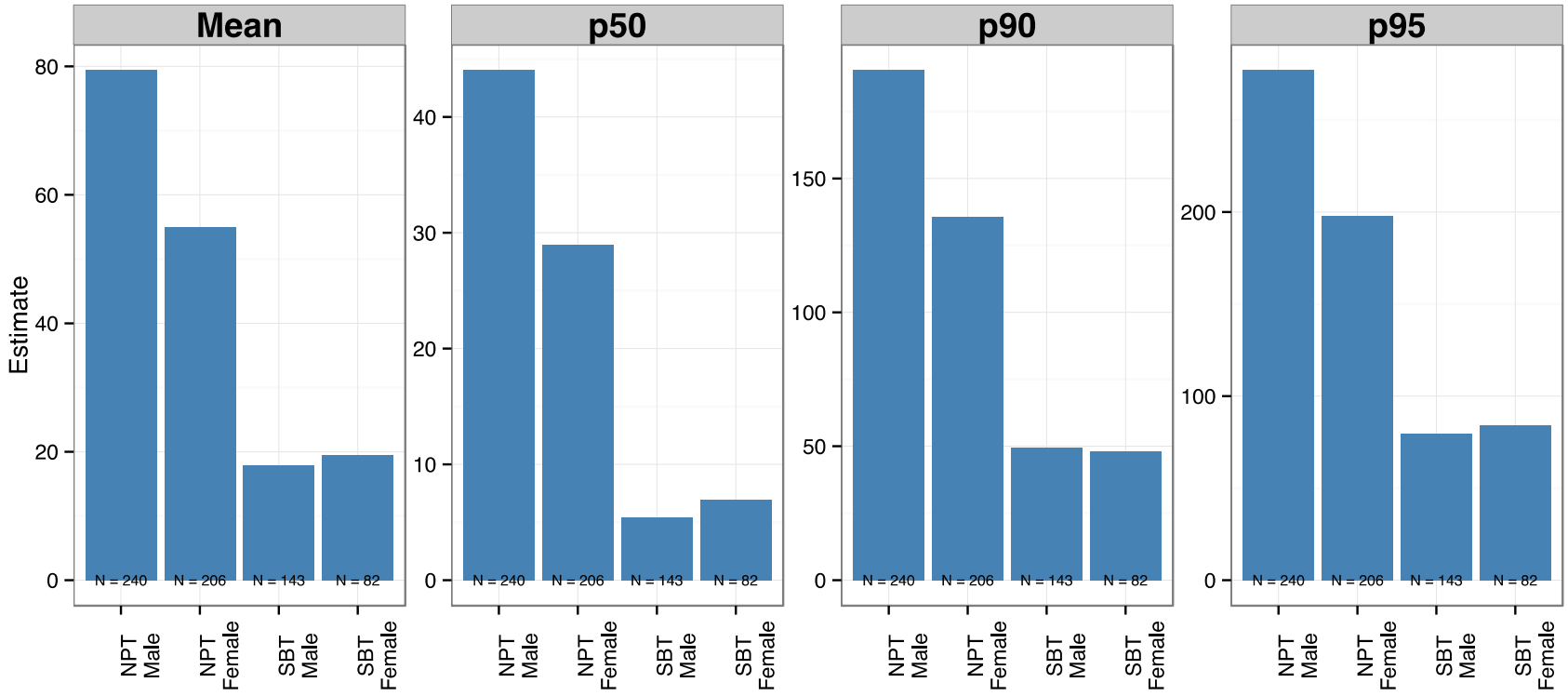


Figure E11. NCI-estimated mean and the 50th, 90th and 95th percentiles by gender and tribe. Model for group 2 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for SBT decile 10.

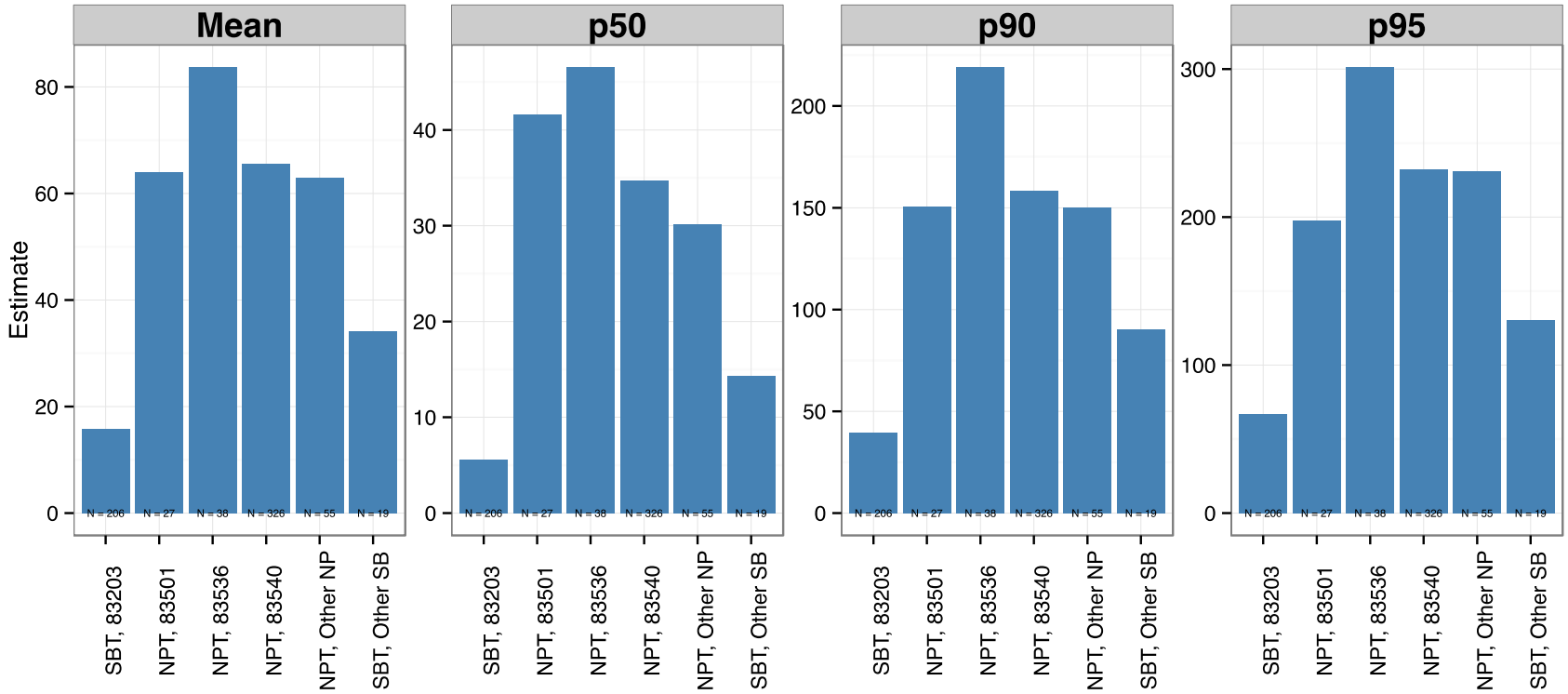


Figure E12. NCI-estimated mean and the 50th, 90th and 95th percentiles by ZIP code. Model for group 2 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for the SBT decile 10.

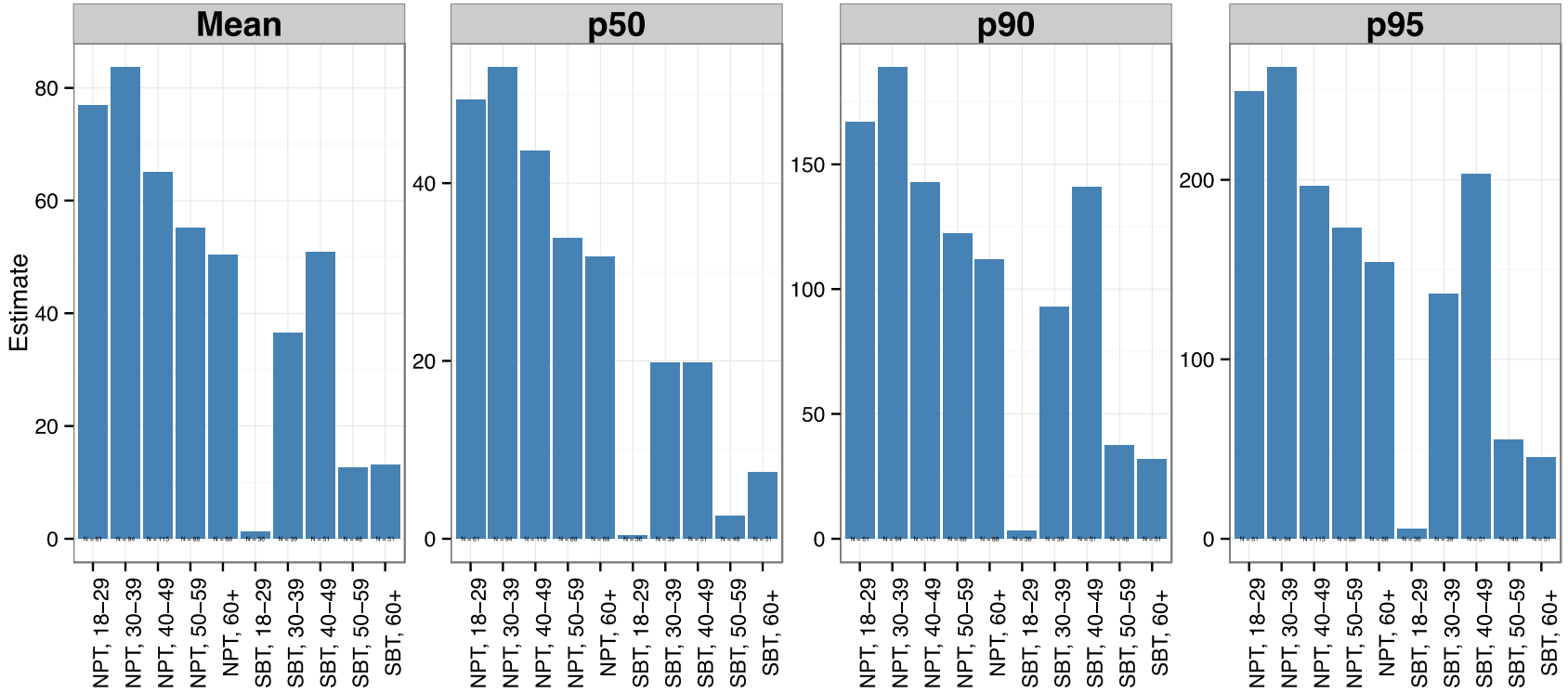


Figure E13. NCI-estimated mean and the 50th, 90th and 95th percentiles by age and tribe. Model for group 2 species. Other covariates include the 3rd root of FFQ, its interaction with tribe and the indicator for SBT decile 10.

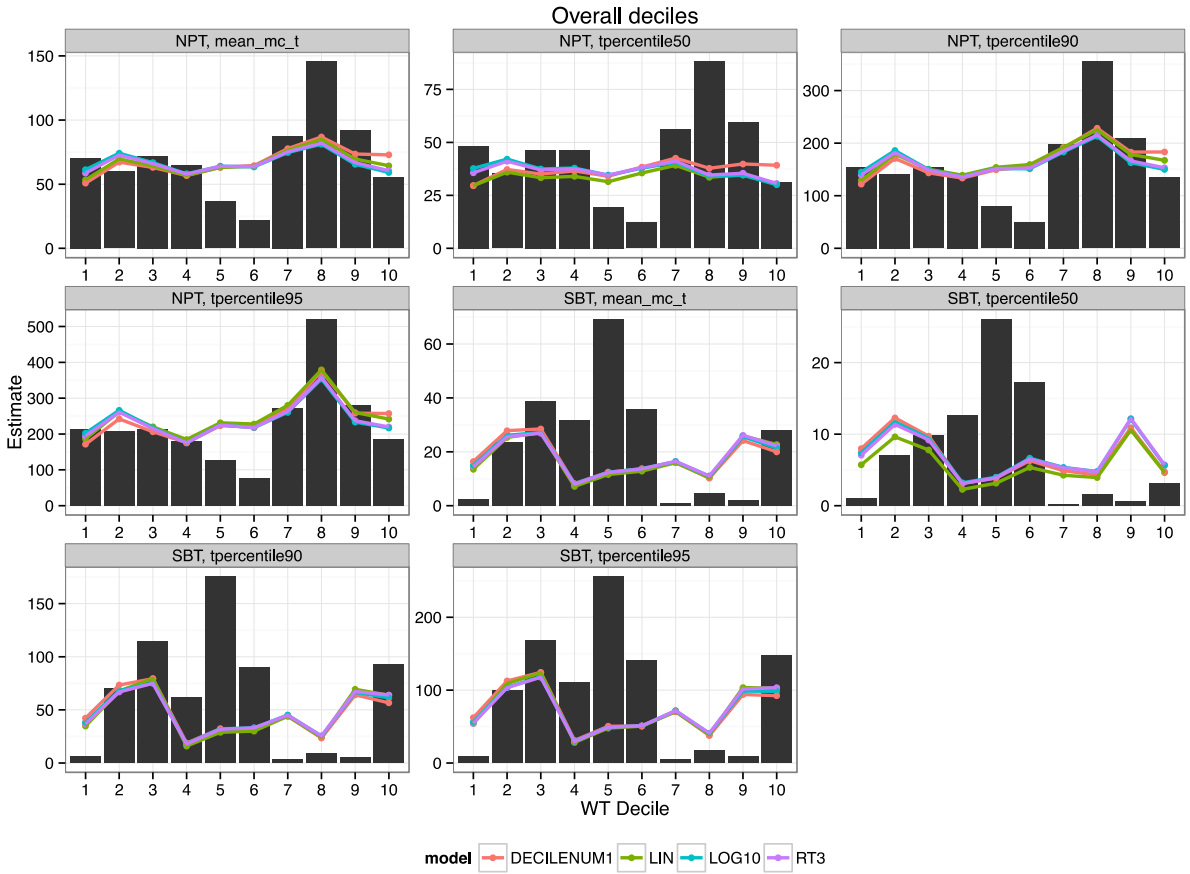


Figure E14. Comparison of four forms of respondent body weight adjustment (colored lines) to the categorical decile of respondent weight adjustment (black bars). Model for group 2 species. DECILENUM2 = the numerical decile of respondent weight (coded as 1-10), LIN = the original (untransformed) respondent weight, LOG10 = the $\log_{10}$ respondent weight, RT3 = the 3rd root respondent weight. Models include an adjustment for FFQ. mean_mc_t = mean, tpercentile50, 90 and 95 = the 50th, 90th and 95th percentiles, respectively.

Table E6. Final model NCI for group 2.

Term	*Estimate*	*Term*	*Estimate*
A01_INTERCEPT	16.2626	P01_INTERCEPT	-3.6988
A02_TRIBE	8.6578	P02_TRIBE	-2.6738
A03_ROOT3FFQ	1.5434	P03_ROOT3FFQ	0.4562
A04_TRIBEROOT3FFQ	-1.8424	P04_TRIBEROOT3FFQ	0.3336
A05_SBT_DEC10	0.546	P05_ SBT_DEC10	-6.0168
A06_WEEKEND	-2.0663	P06_WEEKEND	-0.1213
A07_SECINT	1.2819	P07_SECINT	0.5122
A_LAMBDA	0.4074	P_LOGSDU1	-0.01034
A_LOGSDE	1.6965	Z_U	-0.09476
A_LOGSDU2	1.663	P_VAR_U1	0.9795
		A_VAR_U2	27.8251
		A_VAR_E	29.7566
		cov_u1u2	-0.4932
		RHO	-0.09448

Estimated parameters: Parameters starting with the letters "A" and "P" refer to the amount and probability models, respectively.

A01_INTERCEPT and P01_INTERCEPT= intercept;
A02_TRIBE and P02_TRIBE = tribe (NPT=0, SBT=1);
A03_ROOT3FFQ and P03_ROOT3FFQ = the (untransformed or transformed) FFQ;
A04_TRIBEROOT3FFQ and P04_ TRIBEROOT3FFQ = the tribe-FFQ interaction;
A05_SBT_DEC10 and P05_ SBT_DEC10 = indicator of 10th decile in SBT (0=no,1= yes);
A06_WEEKEND and P06_WEEKEND = weekend indicator (0=no,1= yes);
A07_SECINT and P07_SECINT= 2nd interview (0=no,1= yes);
A_LAMBDA = lambda for the Box-Cox transformation of the consumed amount;
A_LOGSDE = log SD of the residual variance;
A_LOGSDU2 and P_LOGSDU1= log SD of the between-subject variance;
Z_U = the Fisher's transformation of the correlation parameter;
P_VAR_U1 = the between-subject variance for the probability model (U1);
A_VAR_U2 = the between-subject variance for the amount model (U1);
A_VAR_E = the residual variance for the amount model;

cov_u1u2 = covariance between U1 and U2;
RHO = the correlation parameter between U1 and U2

9.4.2 NCI Method—Quality Checking

[BOTH]

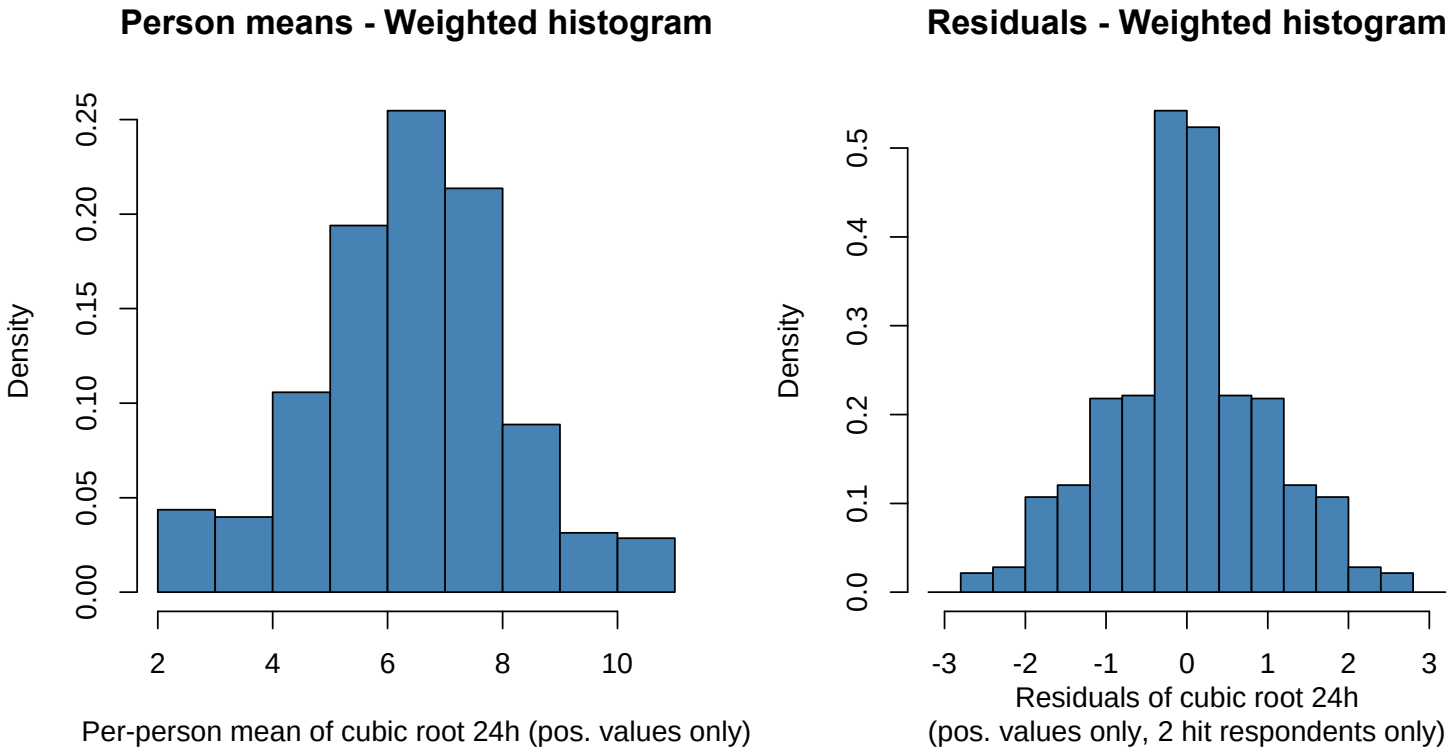


Figure E15. The (survey-weighted) distribution of the person-means and within-person residuals of the third root of the positive group 1 consumption amounts. Both tribes combined.

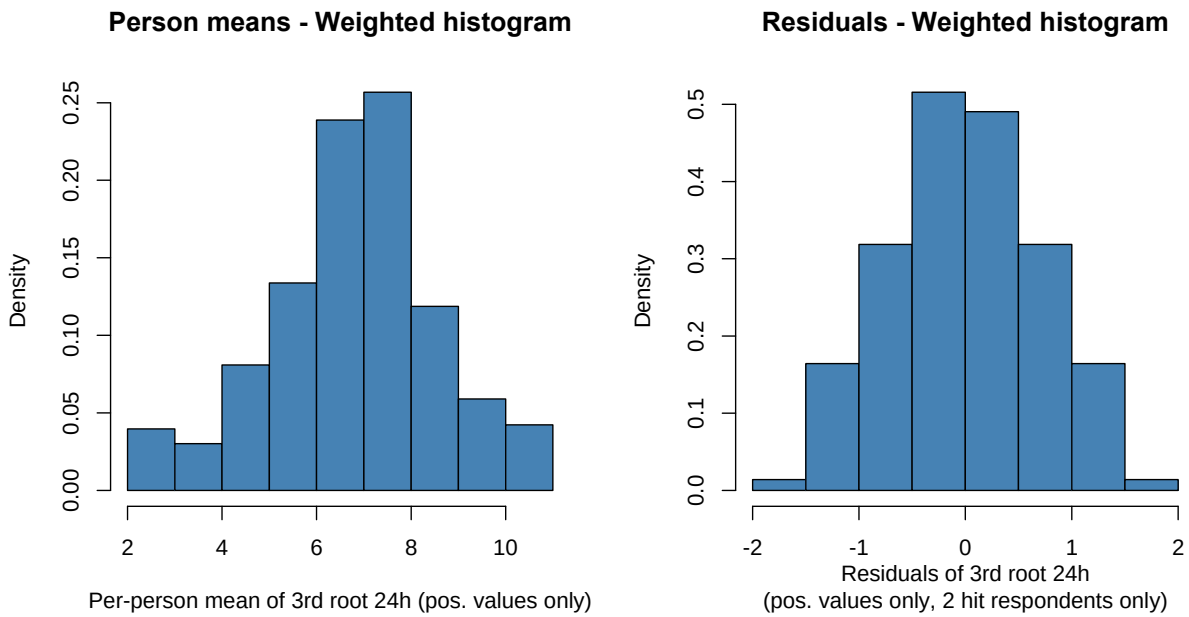


Figure E16. The (survey-weighted) distribution of the person-means and within-person residuals of the third root of the positive group 2 consumption amounts. Both tribes combined.

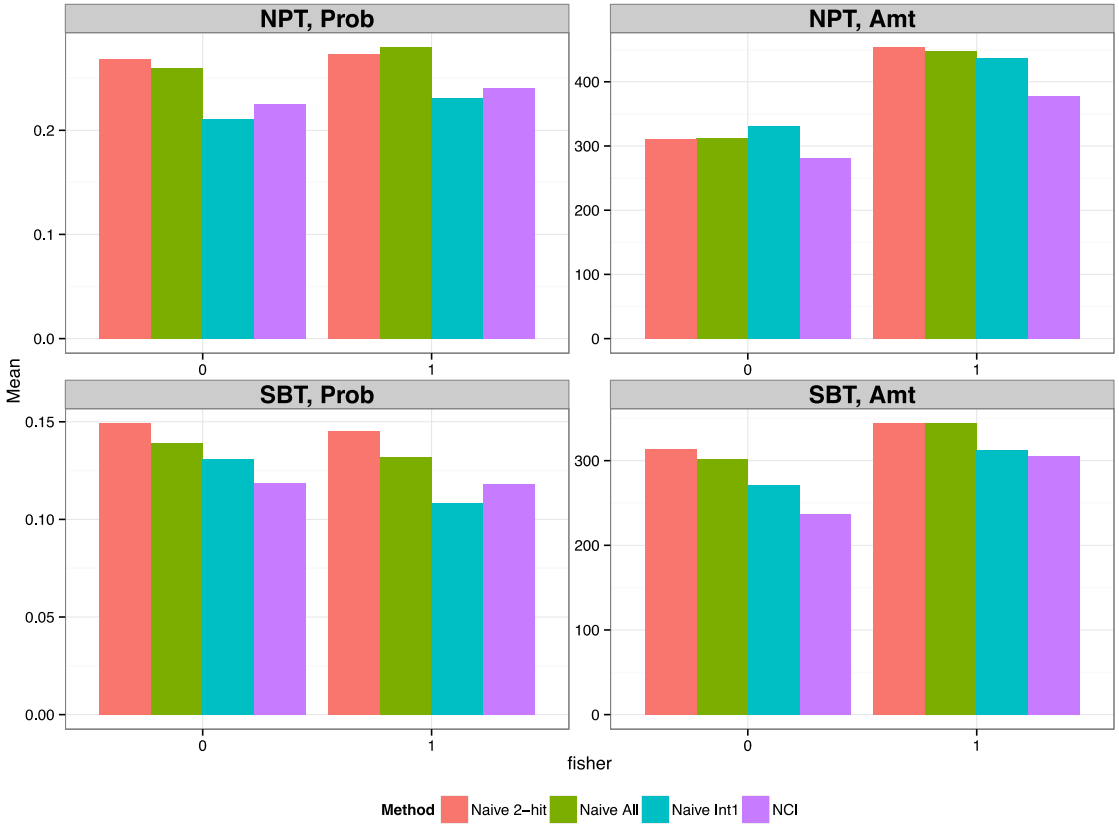


Figure E17. Quality checking of NCI model for group 1 species. Consumption probability and mean amount on consumption days by the respondent's presence on the fishers list. Prob = Probability, Amt = positive consumption amount. 0 = not on the fishers list. 1= on the fishers list. The y-axis shows either the consumption probability (between 0 and 1) or the mean amount on consumption days. Naïve 2-hit = naïve approach limited to respondents with 2 interviews, naïve all = naïve approach with all respondents, naïve int1 = naïve approach limited to 1st interviews, NCI = the NCI model estimate.

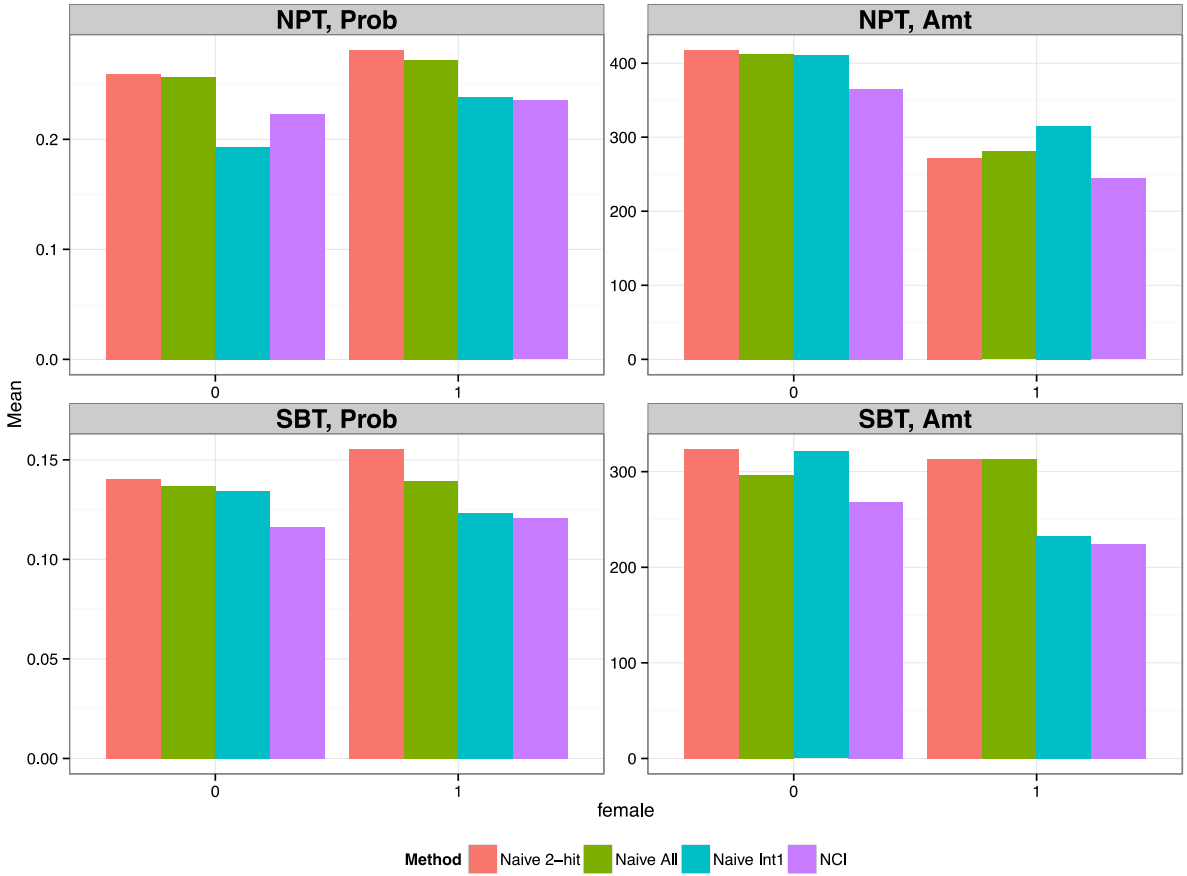


Figure E18. Quality checking of NCI model for group 1 species. Consumption probability and mean amount on consumption days by the respondent's gender. Prob = Probability, Amt = positive consumption amount. 0 = men. 1= women. The y-axis shows either the consumption probability (between 0 and 1) or the mean amount on consumption days. Naïve 2-hit = naïve approach limited to respondents with 2 interviews, naïve all = naïve approach with all respondents, naïve int1 = naïve approach limited to 1st interviews, NCI = the NCI model estimate.

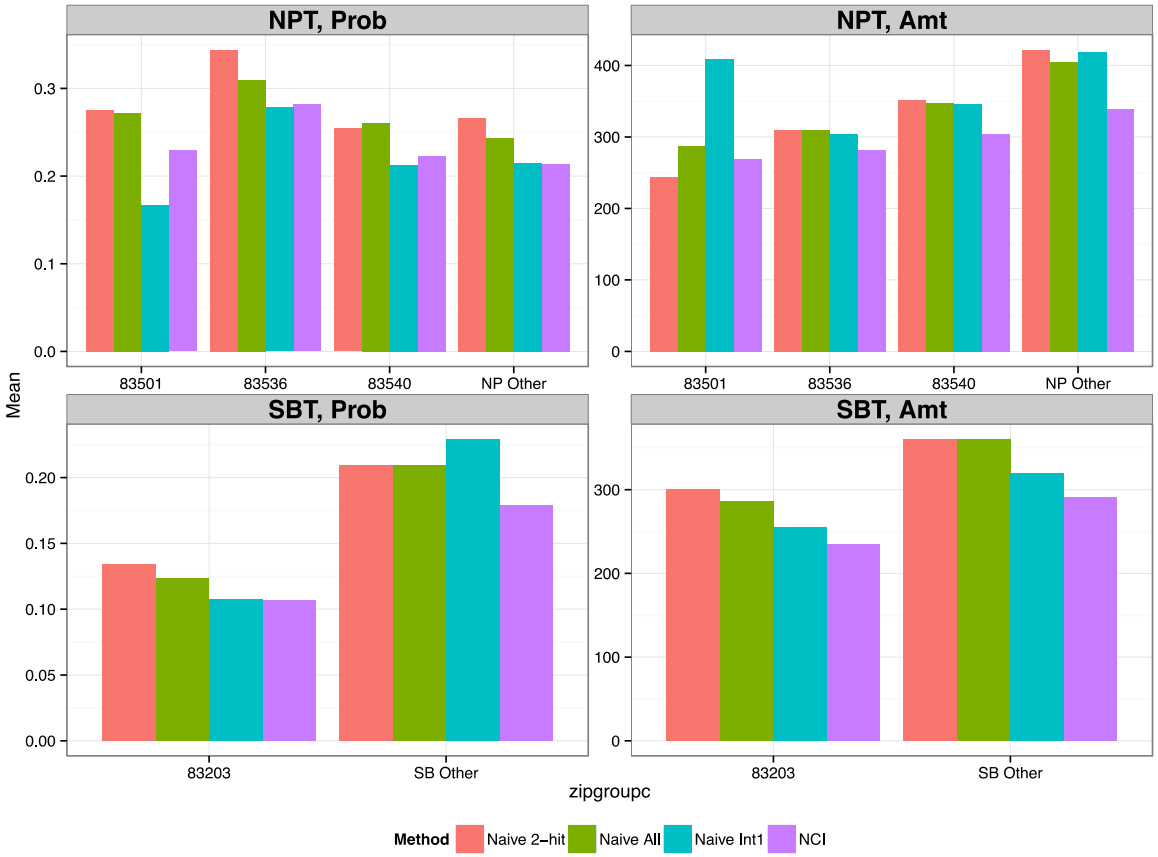


Figure E19. Quality checking of NCI model for group 1 species. Consumption probability and mean amount on consumption days by the respondent's ZIP code. Prob = Probability, Amt = positive consumption amount. The y-axis shows either the consumption probability (between 0 and 1) or the mean amount on consumption days. Naïve 2-hit = naïve approach limited to respondents with 2 interviews, naïve all = naïve approach with all respondents, naïve int1 = naïve approach limited to 1st interviews, NCI = the NCI model estimate.

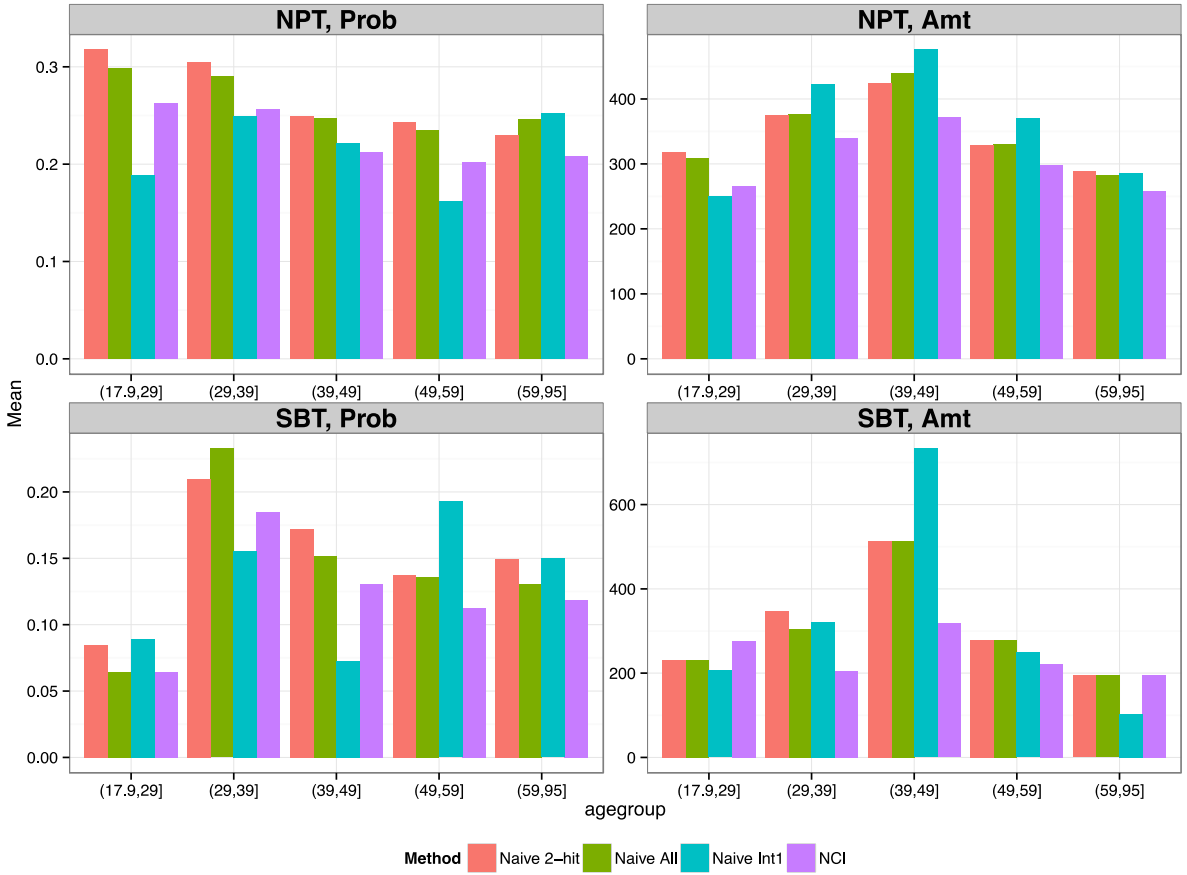


Figure E20. Quality checking of NCI model for group 1 species. Consumption probability and mean amount on consumption days by the respondent's age. Prob = Probability, Amt = positive consumption amount. The y-axis shows either the consumption probability (between 0 and 1) or the mean amount on consumption days. Naïve 2-hit = naïve approach limited to respondents with 2 interviews, naïve all = naïve approach with all respondents, naïve int1 = naïve approach limited to 1st interviews, NCI = the NCI model estimate.

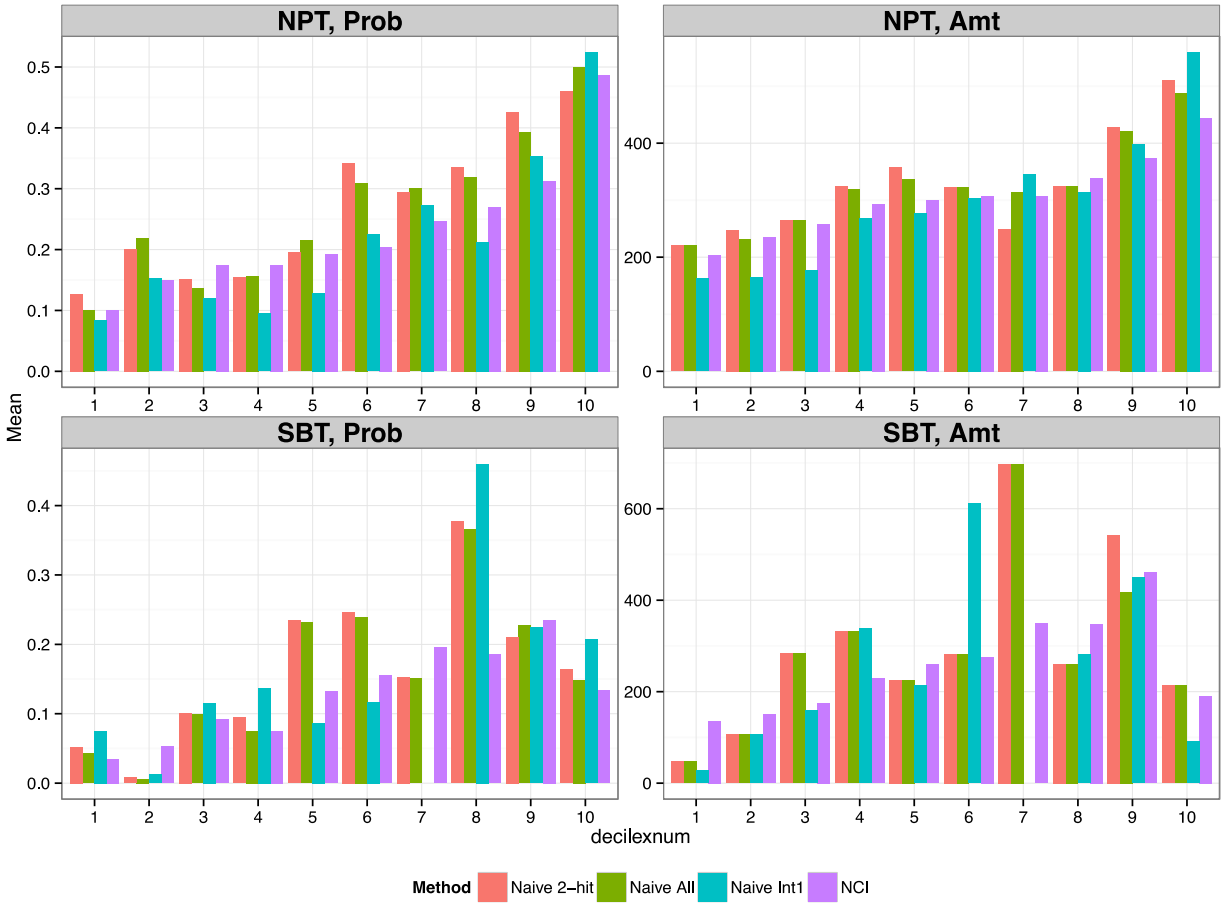


Figure E21. Quality checking of NCI model for group 1 species. Consumption probability and mean amount on consumption days by the respondent's decile of group 1 FFQ consumption. Prob = Probability, Amt = positive consumption amount. The y-axis shows either the consumption probability (between 0 and 1) or the mean amount on consumption days. Naïve 2-hit = naïve approach limited to respondents with 2 interviews, naïve all = naïve approach with all respondents, naïve int1 = naïve approach limited to 1st interviews, NCI = the NCI model estimate.

9.4.3 NCI Method—Confidence Intervals

[BOTH]

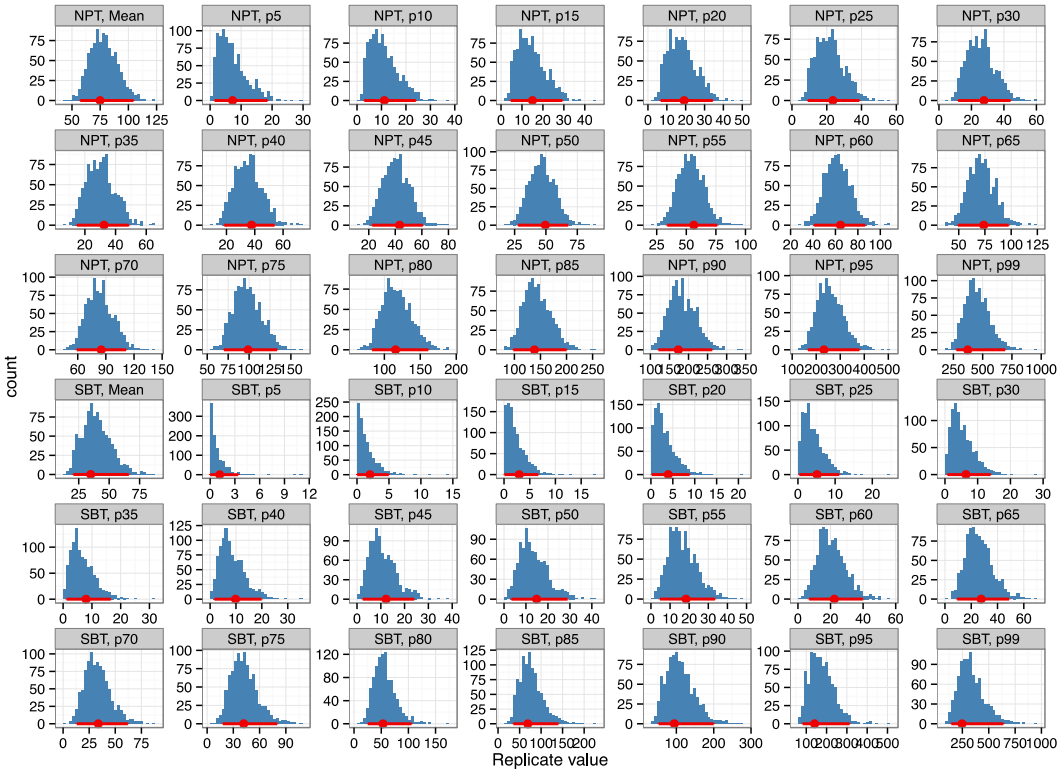


Figure E22. Bootstrap distribution of the NCI method estimated means and selected percentiles for all NPT and SBT respondents. N=978 bootstraps (22 of the 1000 bootstraps did not converge). Group 1 consumption. Red dot shows the point estimate and the red bar around it shows the 95% confidence interval.

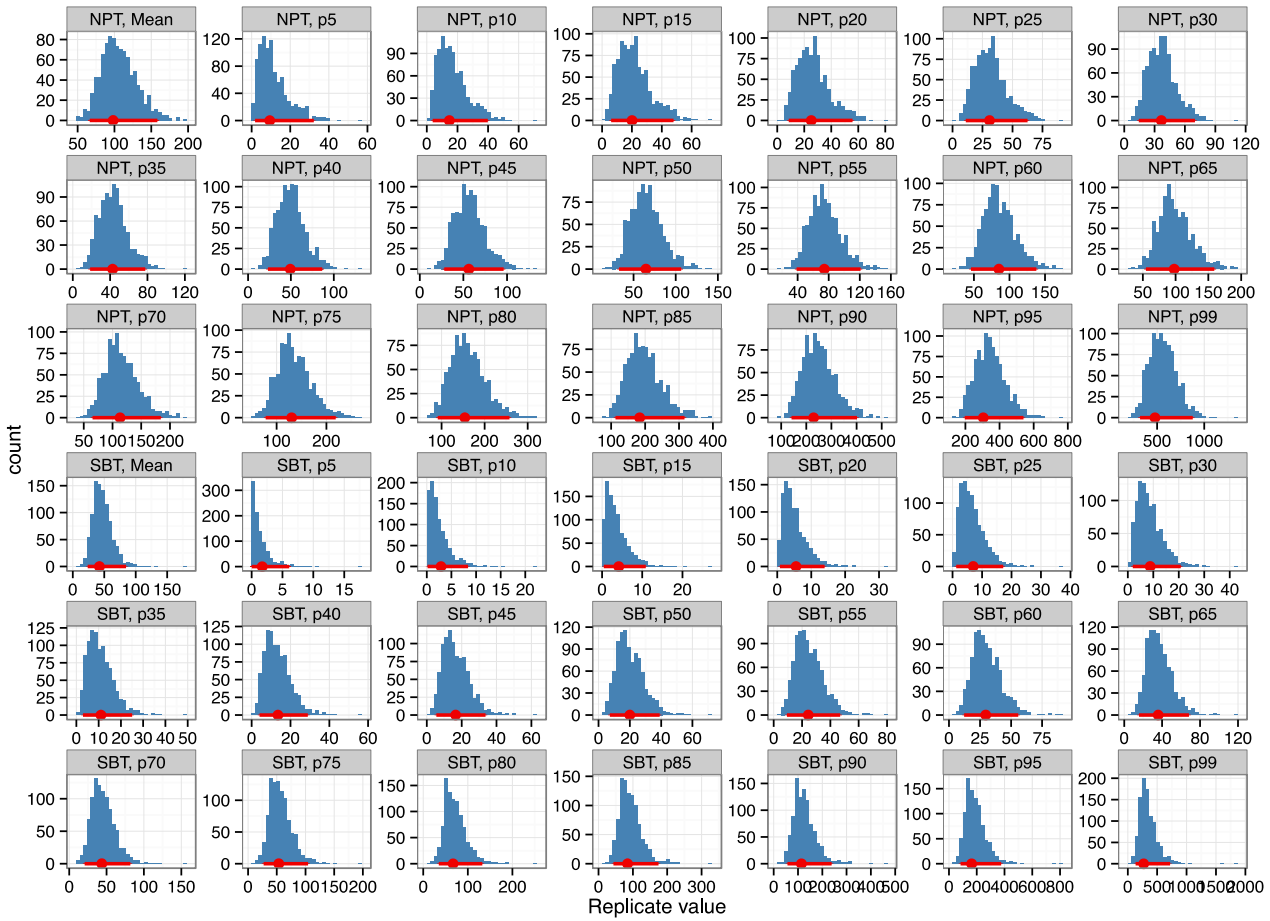


Figure E23. Bootstrap distribution of the NCI method estimated means and selected percentiles for NPT and SBT respondents on the fishers list. N=978 bootstraps (22 of the 1000 bootstraps did not converge). Group 1 consumption. Red dot shows the point estimate and the red bar around it shows the 95% confidence interval.

9.4.4 NCI Method—Sensitivity Analyses

[BOTH]
This section of the appendix shows the numerical results of the sensitivity analyses described in section 5.23.4 of the main report (Sensitivity analyses). Each table in this section compares the results from two different models: a) the final model (used to derive the means and percentiles of consumption presented in the main report) vs. b) a variations on the final model, as noted in the table title. The title of each table is self-explanatory concerning the comparison presented. The mean consumption rate and the 95th percentile of consumption are compared between the final model and another model in each table.

Table E7. NCI estimates from the final model vs. model with log_{10} FFQ replacing 3rd root of FFQ. Group 1 consumption.

				(A) Final model		(B) Log10 FFQ model		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	451	75.0	232.1	75.6	251.4	0.8%	8.3%
NPT	Fisher	Fisher	138	98.2	305.0	95.5	304.5	-2.7%	-0.2%
NPT	Fisher	Non-fisher	313	67.6	206.0	69.3	232.4	2.5%	12.8%
NPT	Gender	Male	241	87.7	268.1	88.0	283.8	0.3%	5.9%
NPT	Gender	Female	210	62.3	194.4	63.3	216.1	1.6%	11.2%
NPT	ZIP	83501	28	63.6	177.7	66.4	222.1	4.4%	25.0%
NPT	ZIP	83536	39	84.5	246.9	86.4	267.6	2.2%	8.4%
NPT	ZIP	83540	329	73.6	227.2	74.9	251.2	1.7%	10.6%
NPT	ZIP	Other	55	79.8	264.2	76.4	257.6	-4.2%	-2.5%
NPT	Age	18-29	61	75.3	232.5	75.2	241.7	-0.1%	4.0%
NPT	Age	30-39	94	92.5	274.2	92.8	293.9	0.4%	7.2%
NPT	Age	40-49	116	83.8	256.3	84.8	279.2	1.3%	8.9%
NPT	Age	50-59	89	66.8	212.7	68.1	236.0	1.9%	11.0%
NPT	Age	60+	91	58.1	182.5	58.7	204.6	1.1%	12.1%
SBT	Overall	Overall	226	34.9	140.9	34.0	140.3	-2.6%	-0.4%
SBT	Fisher	Fisher	134	42.4	163.6	40.4	158.1	-4.6%	-3.4%
SBT	Fisher	Non-fisher	92	33.9	138.3	33.2	138.1	-2.3%	-0.2%
SBT	Gender	Male	143	38.1	158.3	33.9	144.3	-11.0%	-8.8%
SBT	Gender	Female	83	32.2	126.8	34.1	138.4	5.7%	9.1%
SBT	ZIP	83203	207	29.9	121.1	29.1	120.1	-2.5%	-0.8%
SBT	ZIP	Other	19	59.2	209.7	57.5	217.3	-2.9%	3.6%
SBT	Age	18-29	36	24.3	110.2	21.1	89.2	-13.1%	-19.1%
SBT	Age	30-39	39	44.6	159.0	41.6	155.4	-6.8%	-2.2%
SBT	Age	40-49	51	51.7	202.5	51.0	203.3	-1.2%	0.4%
SBT	Age	50-59	48	31.8	125.8	31.3	126.3	-1.7%	0.4%
SBT	Age	60+	52	26.8	90.7	31.4	116.6	17.1%	28.4%

Table E8. NCI estimates from the final model vs. model with log_{10} FFQ replacing 3rd root of FFQ. Group 2 consumption.

				(A) Final model		(B) Log10 FFQ model		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	446	66.5	233.9	66.6	226.2	0.2%	-3.3%
NPT	Fisher	Fisher	138	98.4	345.0	95.1	302.0	-3.4%	-12.5%
NPT	Fisher	Non-fisher	308	55.6	189.5	56.7	189.0	1.9%	-0.2%
NPT	Gender	Male	240	79.4	277.1	79.0	261.9	-0.6%	-5.5%
NPT	Gender	Female	206	55.0	198.0	55.3	196.5	0.7%	-0.7%
NPT	ZIP	83501	27	64.0	197.4	66.6	204.4	4.0%	3.5%
NPT	ZIP	83536	38	83.7	301.5	84.1	282.9	0.4%	-6.2%
NPT	ZIP	83540	326	65.5	232.3	65.1	224.8	-0.7%	-3.2%
NPT	ZIP	Other	55	63.0	231.3	61.1	208.0	-2.9%	-10.1%
NPT	Age	18-29	61	76.9	249.4	74.8	222.4	-2.7%	-10.8%
NPT	Age	30-39	94	83.7	262.8	82.1	241.5	-1.9%	-8.1%
NPT	Age	40-49	115	65.1	196.6	65.0	193.8	-0.1%	-1.4%
NPT	Age	50-59	88	55.2	173.0	54.0	169.6	-2.2%	-2.0%
NPT	Age	60+	88	50.4	153.9	51.9	162.8	3.0%	5.8%
SBT	Overall	Overall	225	18.6	80.0	18.9	81.5	1.2%	1.9%
SBT	Fisher	Fisher	134	23.3	92.6	23.4	91.3	0.2%	-1.4%
SBT	Fisher	Non-fisher	91	17.8	76.8	18.1	78.6	1.6%	2.2%
SBT	Gender	Male	143	18.0	79.4	18.1	82.0	0.8%	3.3%
SBT	Gender	Female	82	19.5	84.3	19.6	85.2	0.9%	1.1%
SBT	ZIP	83203	206	15.8	67.2	16.0	68.4	1.3%	1.8%
SBT	ZIP	Other	19	34.1	130.7	34.0	127.5	-0.4%	-2.4%
SBT	Age	18-29	36	1.3	5.4	1.4	5.8	7.1%	8.9%
SBT	Age	30-39	39	36.5	136.3	36.5	138.1	0.0%	1.4%
SBT	Age	40-49	51	50.9	203.0	51.0	197.9	0.1%	-2.5%
SBT	Age	50-59	48	12.6	55.2	12.8	55.6	1.6%	0.8%
SBT	Age	60+	51	13.1	45.1	12.8	45.2	-2.8%	0.3%

Table E9. NCI estimates from the final model vs. final model without the weekend adjustment. Group 1 consumption.

				(A) Final model		(B) No weekend adjustment		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	451	75.0	232.1	78.0	240.2	4.0%	3.5%
NPT	Fisher	Fisher	138	98.2	305.0	100.0	309.3	1.8%	1.4%
NPT	Fisher	Non-fisher	313	67.6	206.0	71.0	215.3	5.1%	4.5%
NPT	Gender	Male	241	87.7	268.1	90.8	276.9	3.5%	3.3%
NPT	Gender	Female	210	62.3	194.4	65.4	203.4	4.9%	4.6%
NPT	ZIP	83501	28	63.6	177.7	67.3	188.9	5.8%	6.3%
NPT	ZIP	83536	39	84.5	246.9	87.4	254.2	3.4%	3.0%
NPT	ZIP	83540	329	73.6	227.2	77.0	237.3	4.6%	4.5%
NPT	ZIP	Other	55	79.8	264.2	81.4	268.6	2.1%	1.7%
NPT	Age	18-29	61	75.3	232.5	77.2	236.8	2.6%	1.8%
NPT	Age	30-39	94	92.5	274.2	97.2	286.7	5.1%	4.6%
NPT	Age	40-49	116	83.8	256.3	86.7	262.4	3.5%	2.4%
NPT	Age	50-59	89	66.8	212.7	69.2	219.8	3.5%	3.4%
NPT	Age	60+	91	58.1	182.5	61.3	192.4	5.5%	5.4%
SBT	Overall	Overall	226	34.9	140.9	35.0	142.2	0.3%	0.9%
SBT	Fisher	Fisher	134	42.4	163.6	44.5	170.9	5.1%	4.5%
SBT	Fisher	Non-fisher	92	33.9	138.3	33.8	138.0	-0.4%	-0.3%
SBT	Gender	Male	143	38.1	158.3	38.8	160.6	1.9%	1.5%
SBT	Gender	Female	83	32.2	126.8	31.8	124.6	-1.2%	-1.8%
SBT	ZIP	83203	207	29.9	121.1	30.3	123.6	1.4%	2.1%
SBT	ZIP	Other	19	59.2	209.7	57.9	205.7	-2.2%	-1.9%
SBT	Age	18-29	36	24.3	110.2	23.8	108.0	-2.1%	-2.0%
SBT	Age	30-39	39	44.6	159.0	46.7	166.0	4.6%	4.4%
SBT	Age	40-49	51	51.7	202.5	50.1	195.0	-3.1%	-3.7%
SBT	Age	50-59	48	31.8	125.8	33.4	133.1	4.8%	5.8%
SBT	Age	60+	52	26.8	90.7	25.9	88.0	-3.3%	-3.1%

Table E10. NCI estimates from the final model vs. final model without the weekend adjustment. Group 2 consumption.

				(A) Final model		(B) No weekend adjustment		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	446	66.5	233.9	68.9	243.1	3.5%	3.9%
NPT	Fisher	Fisher	138	98.4	345.0	99.7	350.8	1.3%	1.7%
NPT	Fisher	Non-fisher	308	55.6	189.5	58.4	200.6	5.0%	5.9%
NPT	Gender	Male	240	79.4	277.1	81.9	288.8	3.1%	4.2%
NPT	Gender	Female	206	55.0	198.0	57.5	209.3	4.6%	5.7%
NPT	ZIP	83501	27	64.0	197.4	67.2	209.8	4.9%	6.3%
NPT	ZIP	83536	38	83.7	301.5	86.3	313.7	3.1%	4.1%
NPT	ZIP	83540	326	65.5	232.3	68.4	244.9	4.4%	5.4%
NPT	ZIP	Other	55	63.0	231.3	64.0	238.0	1.6%	2.9%
NPT	Age	18-29	61	76.9	249.4	77.2	254.9	0.5%	2.2%
NPT	Age	30-39	94	83.7	262.8	86.9	272.7	3.8%	3.7%
NPT	Age	40-49	115	65.1	196.6	66.6	201.2	2.3%	2.4%
NPT	Age	50-59	88	55.2	173.0	55.7	175.3	0.9%	1.3%
NPT	Age	60+	88	50.4	153.9	52.0	159.2	3.2%	3.5%
SBT	Overall	Overall	225	18.6	80.0	18.8	81.5	1.0%	1.9%
SBT	Fisher	Fisher	134	23.3	92.6	23.8	95.7	1.9%	3.3%
SBT	Fisher	Non-fisher	91	17.8	76.8	17.9	77.9	0.4%	1.3%
SBT	Gender	Male	143	18.0	79.4	18.0	80.2	0.5%	1.0%
SBT	Gender	Female	82	19.5	84.3	20.1	88.1	3.2%	4.6%
SBT	ZIP	83203	206	15.8	67.2	15.4	67.0	-2.2%	-0.4%
SBT	ZIP	Other	19	34.1	130.7	35.9	140.2	5.4%	7.3%
SBT	Age	18-29	36	1.3	5.4	1.3	5.5	4.0%	2.6%
SBT	Age	30-39	39	36.5	136.3	37.7	139.4	3.0%	2.3%
SBT	Age	40-49	51	50.9	203.0	50.7	199.8	-0.4%	-1.5%
SBT	Age	50-59	48	12.6	55.2	13.8	60.1	9.6%	8.9%
SBT	Age	60+	51	13.1	45.1	12.8	43.1	-2.6%	-4.4%

Table E11. NCI estimates from the final model vs. final model without the sequence effect adjustment. Group 1 consumption.

				(A) Final model		(B) No sequence effect adjustment		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	451	75.0	232.1	91.9	264.1	22.5%	13.8%
NPT	Fisher	Fisher	138	98.2	305.0	119.4	343.2	21.6%	12.5%
NPT	Fisher	Non-fisher	313	67.6	206.0	83.1	236.2	22.9%	14.6%
NPT	Gender	Male	241	87.7	268.1	107.9	306.7	23.0%	14.4%
NPT	Gender	Female	210	62.3	194.4	75.9	219.2	21.7%	12.7%
NPT	ZIP	83501	28	63.6	177.7	80.3	209.4	26.2%	17.8%
NPT	ZIP	83536	39	84.5	246.9	102.6	277.1	21.4%	12.2%
NPT	ZIP	83540	329	73.6	227.2	90.0	258.9	22.3%	14.0%
NPT	ZIP	Other	55	79.8	264.2	97.3	302.1	22.0%	14.3%
NPT	Age	18-29	61	75.3	232.5	92.9	265.4	23.5%	14.1%
NPT	Age	30-39	94	92.5	274.2	112.1	305.5	21.3%	11.4%
NPT	Age	40-49	116	83.8	256.3	102.8	290.4	22.7%	13.3%
NPT	Age	50-59	89	66.8	212.7	83.4	250.7	24.7%	17.9%
NPT	Age	60+	91	58.1	182.5	70.0	205.4	20.5%	12.5%
SBT	Overall	Overall	226	34.9	140.9	44.0	172.3	26.1%	22.3%
SBT	Fisher	Fisher	134	42.4	163.6	54.3	199.2	28.1%	21.7%
SBT	Fisher	Non-fisher	92	33.9	138.3	42.7	168.2	25.8%	21.6%
SBT	Gender	Male	143	38.1	158.3	47.0	187.8	23.4%	18.6%
SBT	Gender	Female	83	32.2	126.8	41.5	153.7	28.8%	21.2%
SBT	ZIP	83203	207	29.9	121.1	38.1	148.7	27.6%	22.8%
SBT	ZIP	Other	19	59.2	209.7	72.5	246.1	22.4%	17.4%
SBT	Age	18-29	36	24.3	110.2	29.6	134.3	21.9%	21.8%
SBT	Age	30-39	39	44.6	159.0	56.2	190.0	25.9%	19.5%
SBT	Age	40-49	51	51.7	202.5	66.9	250.0	29.5%	23.5%
SBT	Age	50-59	48	31.8	125.8	38.8	144.5	21.9%	14.9%
SBT	Age	60+	52	26.8	90.7	35.1	113.5	31.1%	25.0%

Table E12. NCI estimates from the final model vs. final model without the sequence effect adjustment. Group 2 consumption.

				(A) Final model		(B) No sequence effect adjustment		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	446	66.5	233.9	82.7	278.8	24.4%	19.2%
NPT	Fisher	Fisher	138	98.4	345.0	122.0	396.6	23.9%	15.0%
NPT	Fisher	Non-fisher	308	55.6	189.5	69.8	221.8	25.5%	17.0%
NPT	Gender	Male	240	79.4	277.1	98.6	323.8	24.1%	16.9%
NPT	Gender	Female	206	55.0	198.0	67.3	231.2	22.5%	16.8%
NPT	ZIP	83501	27	64.0	197.4	79.6	232.5	24.4%	17.8%
NPT	ZIP	83536	38	83.7	301.5	100.7	343.6	20.2%	14.0%
NPT	ZIP	83540	326	65.5	232.3	80.9	275.3	23.5%	18.5%
NPT	ZIP	Other	55	63.0	231.3	78.4	278.6	24.4%	20.4%
NPT	Age	18-29	61	76.9	249.4	92.0	283.3	19.7%	13.6%
NPT	Age	30-39	94	83.7	262.8	100.2	297.6	19.7%	13.2%
NPT	Age	40-49	115	65.1	196.6	78.9	227.4	21.2%	15.7%
NPT	Age	50-59	88	55.2	173.0	67.3	202.6	21.9%	17.1%
NPT	Age	60+	88	50.4	153.9	61.4	179.7	21.8%	16.8%
SBT	Overall	Overall	225	18.6	80.0	24.2	100.1	30.1%	25.3%
SBT	Fisher	Fisher	134	23.3	92.6	29.5	110.8	26.4%	19.6%
SBT	Fisher	Non-fisher	91	17.8	76.8	23.4	96.5	31.0%	25.6%
SBT	Gender	Male	143	18.0	79.4	23.3	98.5	29.9%	24.0%
SBT	Gender	Female	82	19.5	84.3	25.4	106.3	30.3%	26.2%
SBT	ZIP	83203	206	15.8	67.2	20.7	86.5	31.2%	28.7%
SBT	ZIP	Other	19	34.1	130.7	42.5	157.6	24.7%	20.6%
SBT	Age	18-29	36	1.3	5.4	1.7	7.2	36.5%	33.6%
SBT	Age	30-39	39	36.5	136.3	45.9	161.2	25.6%	18.3%
SBT	Age	40-49	51	50.9	203.0	63.0	240.9	23.7%	18.7%
SBT	Age	50-59	48	12.6	55.2	16.2	69.2	29.0%	25.4%
SBT	Age	60+	51	13.1	45.1	16.6	54.1	26.5%	20.0%

Table E13. NCI estimates from the final model vs. final model without correlation between the probability and consumed amount. Group 1 consumption.

				(A) Final model		(B) Without Prob-amt. Correlation		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	451	75.0	232.1	75.0	232.1	0.0%	0.0%
NPT	Fisher	Fisher	138	98.2	305.0	98.3	305.0	0.0%	0.0%
NPT	Fisher	Non-fisher	313	67.6	206.0	67.6	205.9	0.0%	-0.1%
NPT	Gender	Male	241	87.7	268.1	87.7	268.1	0.0%	0.0%
NPT	Gender	Female	210	62.3	194.4	62.3	194.4	0.0%	0.0%
NPT	ZIP	83501	28	63.6	177.7	63.6	177.6	0.0%	-0.1%
NPT	ZIP	83536	39	84.5	246.9	84.5	246.9	0.0%	0.0%
NPT	ZIP	83540	329	73.6	227.2	73.6	227.1	0.0%	0.0%
NPT	ZIP	Other	55	79.8	264.2	79.8	264.4	0.0%	0.1%
NPT	Age	18-29	61	75.3	232.5	75.3	232.5	0.0%	0.0%
NPT	Age	30-39	94	92.5	274.2	92.5	274.2	0.0%	0.0%
NPT	Age	40-49	116	83.8	256.3	83.8	256.4	0.0%	0.0%
NPT	Age	50-59	89	66.8	212.7	66.9	212.9	0.0%	0.1%
NPT	Age	60+	91	58.1	182.5	58.1	182.3	0.0%	-0.1%
SBT	Overall	Overall	226	34.9	140.9	34.9	140.9	0.1%	0.0%
SBT	Fisher	Fisher	134	42.4	163.6	42.4	163.6	0.1%	0.0%
SBT	Fisher	Non-fisher	92	33.9	138.3	34.0	138.4	0.1%	0.0%
SBT	Gender	Male	143	38.1	158.3	38.1	158.5	0.1%	0.1%
SBT	Gender	Female	83	32.2	126.8	32.2	126.7	0.1%	-0.1%
SBT	ZIP	83203	207	29.9	121.1	29.9	121.2	0.1%	0.1%
SBT	ZIP	Other	19	59.2	209.7	59.3	209.6	0.1%	0.0%
SBT	Age	18-29	36	24.3	110.2	24.3	110.4	0.1%	0.1%
SBT	Age	30-39	39	44.6	159.0	44.6	158.7	0.1%	-0.1%
SBT	Age	40-49	51	51.7	202.5	51.7	202.7	0.1%	0.1%
SBT	Age	50-59	48	31.8	125.8	31.9	125.9	0.1%	0.1%
SBT	Age	60+	52	26.8	90.7	26.8	90.8	0.0%	0.1%

Table E14. NCI estimates from the final model vs. final model without correlation between the probability and consumed amount. Group 2 consumption.

				(A) Final model		(B) Without Prob-amt. Correlation		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	446	66.5	233.9	66.9	238.8	0.6%	2.1%
NPT	Fisher	Fisher	138	98.4	345.0	97.9	347.5	-0.5%	0.7%
NPT	Fisher	Non-fisher	308	55.6	189.5	56.4	196.9	1.4%	3.9%
NPT	Gender	Male	240	79.4	277.1	79.3	274.0	-0.1%	-1.1%
NPT	Gender	Female	206	55.0	198.0	54.8	196.5	-0.4%	-0.8%
NPT	ZIP	83501	27	64.0	197.4	63.6	193.6	-0.7%	-1.9%
NPT	ZIP	83536	38	83.7	301.5	83.5	300.0	-0.3%	-0.5%
NPT	ZIP	83540	326	65.5	232.3	65.2	229.5	-0.4%	-1.2%
NPT	ZIP	Other	55	63.0	231.3	62.9	230.5	-0.1%	-0.4%
NPT	Age	18-29	61	76.9	249.4	76.7	251.8	-0.2%	1.0%
NPT	Age	30-39	94	83.7	262.8	83.9	264.9	0.3%	0.8%
NPT	Age	40-49	115	65.1	196.6	64.0	195.9	-1.6%	-0.3%
NPT	Age	50-59	88	55.2	173.0	54.6	173.9	-1.0%	0.5%
NPT	Age	60+	88	50.4	153.9	50.7	156.5	0.6%	1.7%
SBT	Overall	Overall	225	18.6	80.0	18.8	81.6	0.9%	2.0%
SBT	Fisher	Fisher	134	23.3	92.6	23.5	95.8	0.9%	3.5%
SBT	Fisher	Non-fisher	91	17.8	76.8	18.1	79.5	1.5%	3.5%
SBT	Gender	Male	143	18.0	79.4	17.9	78.9	-0.3%	-0.6%
SBT	Gender	Female	82	19.5	84.3	19.4	83.5	-0.2%	-0.9%
SBT	ZIP	83203	206	15.8	67.2	15.7	66.4	-0.5%	-1.2%
SBT	ZIP	Other	19	34.1	130.7	33.7	128.1	-1.1%	-2.0%
SBT	Age	18-29	36	1.3	5.4	1.2	5.2	-2.2%	-2.6%
SBT	Age	30-39	39	36.5	136.3	36.3	137.3	-0.7%	0.8%
SBT	Age	40-49	51	50.9	203.0	50.5	206.8	-0.7%	1.9%
SBT	Age	50-59	48	12.6	55.2	12.5	55.4	-0.6%	0.4%
SBT	Age	60+	51	13.1	45.1	12.9	45.0	-1.5%	-0.2%

Table E15. NCI estimates for the NPT from the final model fit to data from NPT + SBT vs. final model fit only to the NPT data. Group 1 consumption.

				(A) Final model		(B) NPT data only		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	451	75.0	232.1	70.9	254.3	-5.4%	9.6%
NPT	Fisher	Fisher	138	98.2	305.0	92.0	327.2	-6.3%	7.3%
NPT	Fisher	Non-fisher	313	67.6	206.0	64.2	231.5	-5.0%	12.4%
NPT	Gender	Male	241	87.7	268.1	84.0	300.9	-4.2%	12.3%
NPT	Gender	Female	210	62.3	194.4	57.9	212.5	-7.0%	9.3%
NPT	ZIP	83501	28	63.6	177.7	61.7	212.1	-3.0%	19.3%
NPT	ZIP	83536	39	84.5	246.9	79.8	265.9	-5.6%	7.7%
NPT	ZIP	83540	329	73.6	227.2	70.1	253.5	-4.7%	11.6%
NPT	ZIP	Other	55	79.8	264.2	73.1	274.3	-8.4%	3.8%
NPT	Age	18-29	61	75.3	232.5	71.7	247.0	-4.8%	6.2%
NPT	Age	30-39	94	92.5	274.2	88.6	305.5	-4.2%	11.4%
NPT	Age	40-49	116	83.8	256.3	78.6	280.1	-6.2%	9.3%
NPT	Age	50-59	89	66.8	212.7	62.8	238.3	-6.1%	12.1%
NPT	Age	60+	91	58.1	182.5	54.4	202.7	-6.4%	11.0%

Table E16. NCI estimates for the NPT from the final model fit to data from NPT + SBT vs. final model fit only to the NPT data Group 2 consumption.

				(A) Final model		(B) NPTT data only		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	446	66.5	233.9	58.1	188.9	-12.7%	-19.3%
NPT	Fisher	Fisher	138	98.4	345.0	88.5	296.9	-10.0%	-13.9%
NPT	Fisher	Non-fisher	308	55.6	189.5	48.0	147.5	-13.7%	-22.1%
NPT	Gender	Male	240	79.4	277.1	71.6	233.8	-9.9%	-15.6%
NPT	Gender	Female	206	55.0	198.0	46.7	158.2	-15.1%	-20.1%
NPT	ZIP	83501	27	64.0	197.4	55.5	150.9	-13.3%	-23.6%
NPT	ZIP	83536	38	83.7	301.5	74.7	268.1	-10.8%	-11.1%
NPT	ZIP	83540	326	65.5	232.3	56.0	184.9	-14.5%	-20.4%
NPT	ZIP	Other	55	63.0	231.3	54.9	202.2	-12.8%	-12.6%
NPT	Age	18-29	61	76.9	249.4	67.0	235.4	-12.9%	-5.6%
NPT	Age	30-39	94	83.7	262.8	73.5	242.9	-12.2%	-7.6%
NPT	Age	40-49	115	65.1	196.6	54.8	174.6	-15.9%	-11.2%
NPT	Age	50-59	88	55.2	173.0	45.9	149.7	-16.8%	-13.5%
NPT	Age	60+	88	50.4	153.9	43.1	137.7	-14.4%	-10.5%

Table E17. NCI estimates from the final model vs. simpler model (tribe, 3rd root of FFQ, tribe by 3rd root of FFQ interaction and a single covariate for groups as needed). Group 1 consumption.

				(A) Final model		(B) Simpler model		% difference (B-A)/A *100%	
Tribe	Grouping variable	Group	N	Mean	p95	Mean	p95	Mean	p95
NPT	Overall	Overall	451	75.0	232.1	75.2	252.3	0.3%	8.7%
NPT	Fisher	Fisher	138	98.2	305.0	101.4	333.7	3.2%	9.4%
NPT	Fisher	Non-fisher	313	67.6	206.0	68.3	226.8	1.1%	10.1%
NPT	Gender	Male	241	87.7	268.1	89.8	286.3	2.4%	6.8%
NPT	Gender	Female	210	62.3	194.4	62.3	198.7	-0.1%	2.2%
NPT	ZIP	83501	28	63.6	177.7	57.2	182.7	-10.1%	2.8%
NPT	ZIP	83536	39	84.5	246.9	84.0	276.2	-0.6%	11.8%
NPT	ZIP	83540	329	73.6	227.2	74.3	256.6	1.0%	13.0%
NPT	ZIP	Other	55	79.8	264.2	80.9	287.9	1.4%	9.0%
NPT	Age	18-29	61	75.3	232.5	74.2	224.2	-1.5%	-3.6%
NPT	Age	30-39	94	92.5	274.2	92.8	278.8	0.4%	1.7%
NPT	Age	40-49	116	83.8	256.3	84.8	258.5	1.2%	0.8%
NPT	Age	50-59	89	66.8	212.7	65.5	215.3	-2.1%	1.2%
NPT	Age	60+	91	58.1	182.5	58.1	182.6	0.0%	0.1%
SBT	Overall	Overall	226	34.9	140.9	34.5	142.8	-1.1%	1.3%
SBT	Fisher	Fisher	134	42.4	163.6	42.1	161.9	-0.8%	-1.0%
SBT	Fisher	Non-fisher	92	33.9	138.3	33.5	138.6	-1.4%	0.2%
SBT	Gender	Male	143	38.1	158.3	38.7	161.7	1.7%	2.2%
SBT	Gender	Female	83	32.2	126.8	31.3	123.3	-3.0%	-2.8%
SBT	ZIP	83203	207	29.9	121.1	29.3	126.9	-1.8%	4.8%
SBT	ZIP	Other	19	59.2	209.7	56.8	212.6	-4.1%	1.4%
SBT	Age	18-29	36	24.3	110.2	21.0	94.3	-13.7%	-14.4%
SBT	Age	30-39	39	44.6	159.0	45.9	169.2	2.9%	6.4%
SBT	Age	40-49	51	51.7	202.5	52.3	196.2	1.3%	-3.1%
SBT	Age	50-59	48	31.8	125.8	33.5	131.1	5.2%	4.2%
SBT	Age	60+	52	26.8	90.7	27.2	97.1	1.6%	7.0%

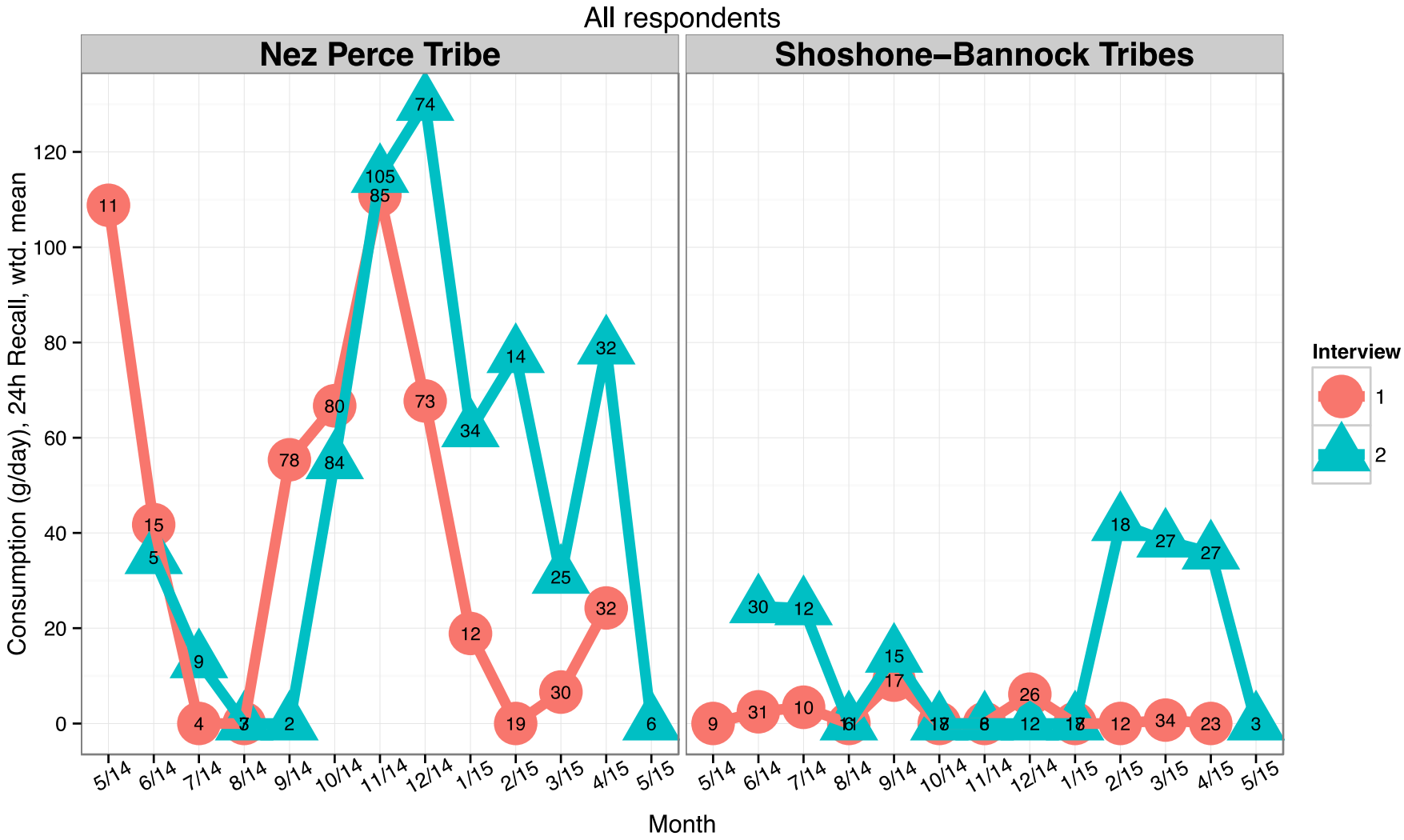


Figure E24. Mean 24-hour recall consumption rate for all salmon and steelhead species (combined) by tribe, interview month and interview number (1st and 2nd interview). Numbers within each month's dot are the sample size. One outlier data point for a single NPT second interview during May (5/14) was excluded.

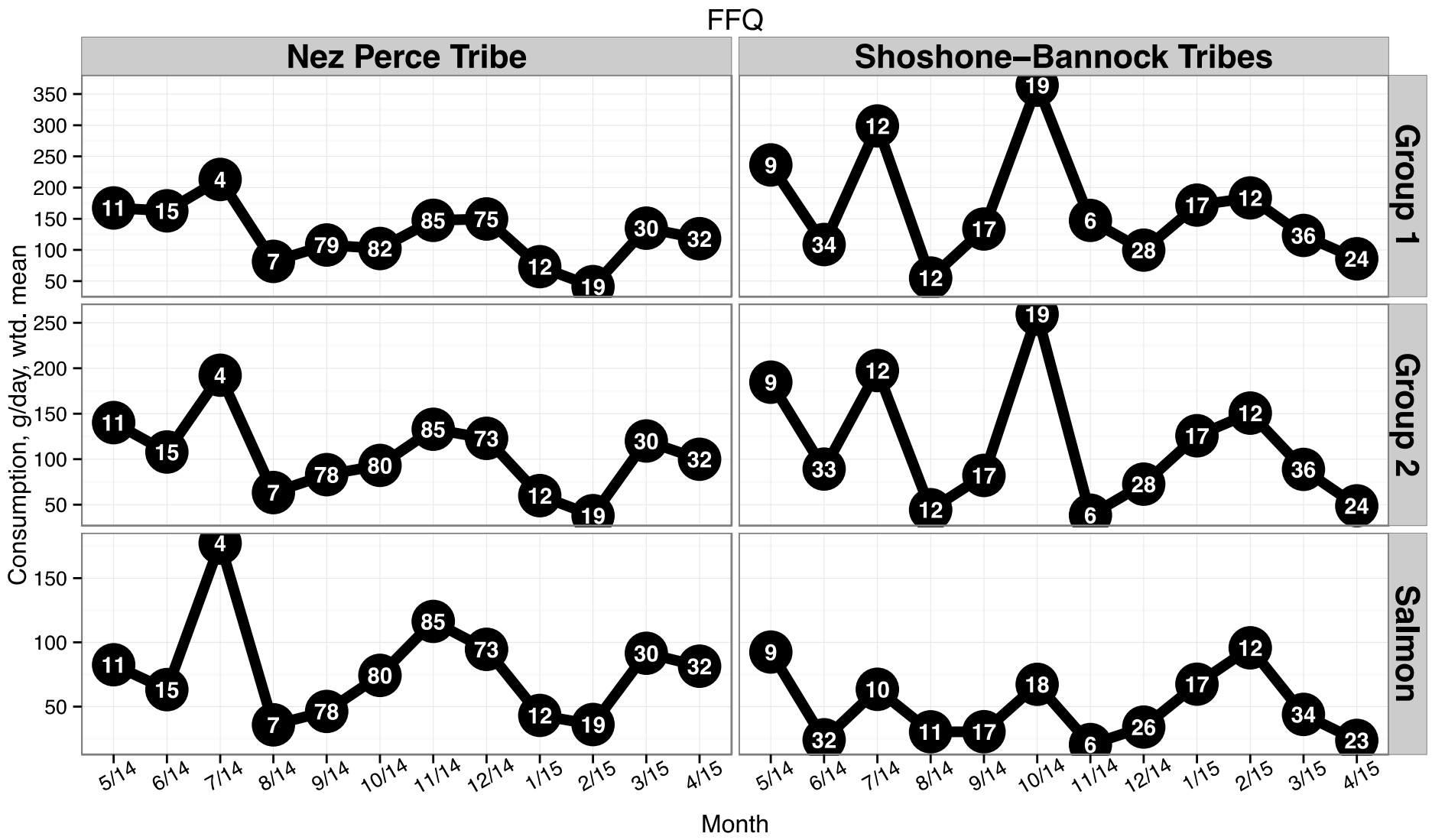


Figure E25. Mean Group 1 FFQ consumption rate (grams per day) by tribe, species group and interview month. Numbers within each month's dot are the sample size. Salmon: all salmon and steelhead species combined.

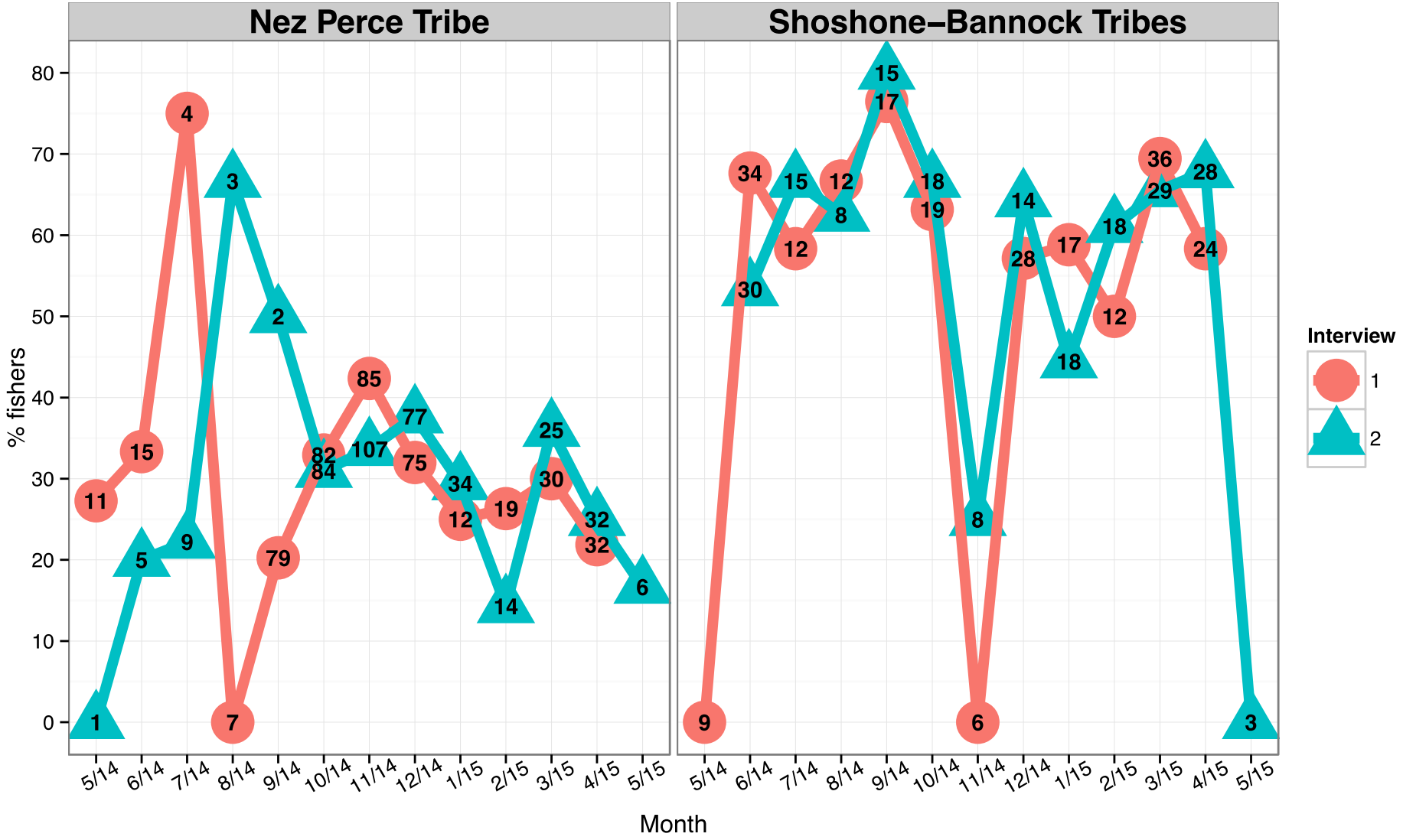


Figure E26. Percentages of fishers among respondents by tribe, interview month and interview number (1st and 2nd interviews). Numbers within each month's dot are the sample size.

9.5 Appendix F—Geographic Inclusion Criteria—Additional Information

[NPT]
The process for selecting a geographic area for sampling members of the Nez Perce Tribe was based on ZIP code boundaries for zip codes in and around the Nez Perce reservation. The Zip code boundaries were delineated using a Geographic Information System (GIS)—specifically, the ArcGIS software program. ZIP code boundaries were downloaded from the U.S. Census Bureau, circa 2010. To subset the ZIP codes from national to local scale, buffers of 25 and 50 miles (called sampling "hubs") were created around the primary population centers of Lapwai and Kamiah using ArcGIS. Any ZIP code boundary that included any portion of the land area within either buffer was then selected for inclusion in the first iteration of the ZIP code subset.

Using this ZIP code subset, a population center for each ZIP code was identified using the U.S. Postal Service ZIP code lookup tool. These population centers were then selected in ArcGIS from the "Cities and Towns" dataset available from the National Atlas of the United States (NAUS). If the population center was not present in the NAUS dataset, it was instead digitized in ArcGIS through aerial interpretation of high-resolution basemaps. Once the population centers were assigned to every ZIP code, a second iteration of the ZIP code subset was created. For this second iteration, any ZIP code whose population center was not included within the 25- or 50-mile buffer from either sampling hub was removed from the ZIP code subset.

Using this second iteration of the ZIP code subset, each code was first assigned to a sampling hub (either Lapwai or Kamiah) based on the closest aerial distance of the ZIP code population center to the sampling hub. Once each ZIP code was assigned to a sampling hub, it was then assigned to a buffer zone of either 25 or 50 miles (depending on the distance from the ZIP code's population center to the sampling hub). The ZIP codes were then plotted on a map, symbolizing each ZIP code as either 25 or 50 miles from either sampling hub, as shown in Figure F1.

The distances between each ZIP code population center and the sampling hubs were calculated in ArcGIS using an automatic straight-line distance-calculation tool. Since the geographical coordinates of the population centers were provided in feet according to the Idaho State Plane Coordinate System, the distances were measured in feet and then converted to miles. The distances calculated from each population center to Lapwai and Kamiah, according to ZIP code, are provided in Table F1.

Figure F1. Nez Perce reservation and surrounding eligible ZIP codes for inclusion in the Nez Perce Tribe fish consumption survey.

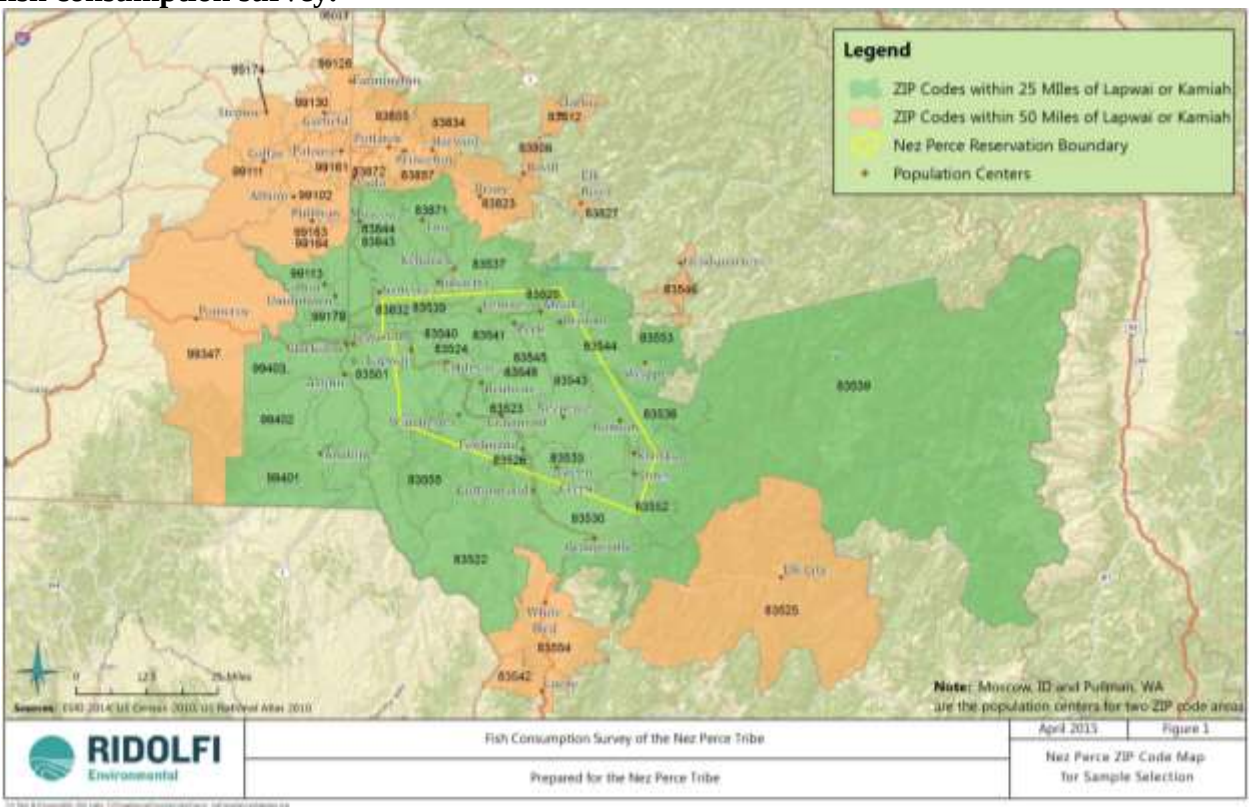


Table F1. Nez Perce reservation ZIP codes, corresponding population centers, and distances to sampling hubs for the Nez Perce Tribe survey.

ZIP Code	Population Center	Distance to Lapwai (Miles)	Distance to Kamiah (Miles)	Buffer Distance	Closest Sampling Hub
83501	Lewiston	10.21	49.14	25	Lapwai
83520	Ahsaka	23.93	23.91	25	Kamiah
83522	Cottonwood	32.94	19.74	25	Kamiah
83523	Craigmont	19.75	21.03	25	Lapwai
83524	Culdesac	6.64	32.50	25	Lapwai
83525	Elk City	76.90	39.69	50	Kamiah
83526	Ferdinand	26.50	18.04	25	Kamiah
83530	Grangeville	46.58	21.26	25	Kamiah
83533	Green Creek	33.15	13.88	25	Kamiah
83535	Juliaetta	12.92	40.49	25	Lapwai
83536	Kamiah	39.15	0.00	25	Kamiah
83537	Kendrick	16.33	39.84	25	Lapwai
83539	Kooskia	43.54	6.20	25	Kamiah
83540	Lapwai	0.00	39.14	25	Lapwai
83541	Lenore	14.01	31.71	25	Lapwai
83542	Lucile	64.69	49.77	50	Kamiah

83543	Nezperce	29.48	10.16	25	Kamiah
83544	Orofino	26.78	20.52	25	Kamiah
83545	Peck	18.84	25.53	25	Lapwai
83546	Headquarters	50.03	29.80	50	Kamiah
83548	Reubens	13.80	25.48	25	Lapwai
83552	Stites	45.28	9.71	25	Kamiah
83553	Weippe	41.52	11.18	25	Kamiah
83554	White Bird	50.68	34.75	50	Kamiah
83555	Winchester	14.32	28.57	25	Lapwai
83806	Bovill	37.01	47.01	50	Lapwai
83812	Clarkia	49.39	55.32	50	Lapwai
83823	Deary	29.75	46.88	50	Lapwai
83827	Elk River	39.67	39.14	50	Kamiah
83832	Genesee	11.62	48.37	25	Lapwai
83834	Harvard	35.61	58.43	50	Lapwai
83843	Moscow	24.50	58.08	25	Lapwai
83844	Moscow	24.50	58.08	25	Lapwai
83855	Potlatch	36.02	63.44	50	Lapwai
83857	Princeton	35.24	61.21	50	Lapwai
83871	Troy	23.02	49.93	25	Lapwai
83872	Viola	32.06	63.84	50	Lapwai
99102	Albion	34.13	70.16	50	Lapwai
99111	Colfax	42.33	78.09	50	Lapwai
99174	Steptoe	49.21	83.14	50	Lapwai
99113	Colton	19.14	57.64	25	Lapwai
99128	Farmington	48.70	76.76	50	Lapwai
99130	Garfield	44.68	75.66	50	Lapwai
99161	Palouse	37.26	68.73	50	Lapwai
99163	Pullman	28.80	65.09	50	Lapwai
99164	Pullman	28.80	65.09	50	Lapwai
99179	Uniontown	16.41	55.07	25	Lapwai
99347	Pomeroy	38.47	77.29	50	Lapwai
99401	Anatone	24.47	53.46	25	Lapwai
99402	Asotin	12.50	49.47	25	Lapwai
99403	Clarkston	11.52	50.40	25	Lapwai

[SBT]
The process for selecting a geographic area for sampling members of the Shoshone-Bannock Tribes was based on ZIP code boundaries for ZIP codes in and around the Shoshone-Bannock reservation. The Zip code boundaries were delineated using a Geographic Information System (GIS)—specifically, the ArcGIS software program. ZIP code boundaries were downloaded from the U.S. Census Bureau, circa 2010. To subset the ZIP codes from national to local scale, buffers of 25 and 50 miles (called sampling "hubs") were created around the primary population centers of Fort Hall and Blackfoot using ArcGIS. Any ZIP code boundary that included any portion of the land area within either buffer was then selected for inclusion in the first iteration of the ZIP code subset.

Using this ZIP code subset, a population center for each ZIP code was identified using the U.S. Postal Service ZIP code lookup tool. These population centers were then selected in GIS from the "Cities and Towns" dataset available from the National Atlas of the United States (NAUS). If the population center was not present in the NAUS dataset, it was instead digitized in ArcGIS through aerial interpretation of high-resolution basemaps. Once the population centers were assigned to every ZIP code, a second iteration of the ZIP code subset was created. For this second iteration, any ZIP code whose population center was not included within the 25- or 50-mile buffer from either sampling hub was removed from the ZIP code subset.

Using this second iteration of the ZIP code subset, each code was first assigned to a sampling hub (either Fort Hall or Blackfoot) based on the closest aerial distance of the ZIP code population center to the sampling hub. Once each ZIP code was assigned to a sampling hub, it was then assigned to a buffer zone of either 25 or 50 miles (depending on the distance from the ZIP code's population center to the sampling hub). The ZIP codes were then plotted on a map, symbolizing each ZIP code as either 25 or 50 miles from either sampling hub, as shown in Figure F1.

The distance between each ZIP code population center and the sampling hubs were calculated in ArcGIS using an automatic straight-line distance-calculation tool. Since the geographical coordinates of the population centers were provided in feet according to the Idaho State Plane Coordinate System, the distances were measured in feet and then converted to miles. The distances calculated from each population center to Fort Hall and to Blackfoot, according to ZIP code, are provided in Table F1.

Figure F1. Fort Hall Reservation and surrounding eligible ZIP codes for inclusion in the Shoshone-Bannock Tribes fish consumption survey.

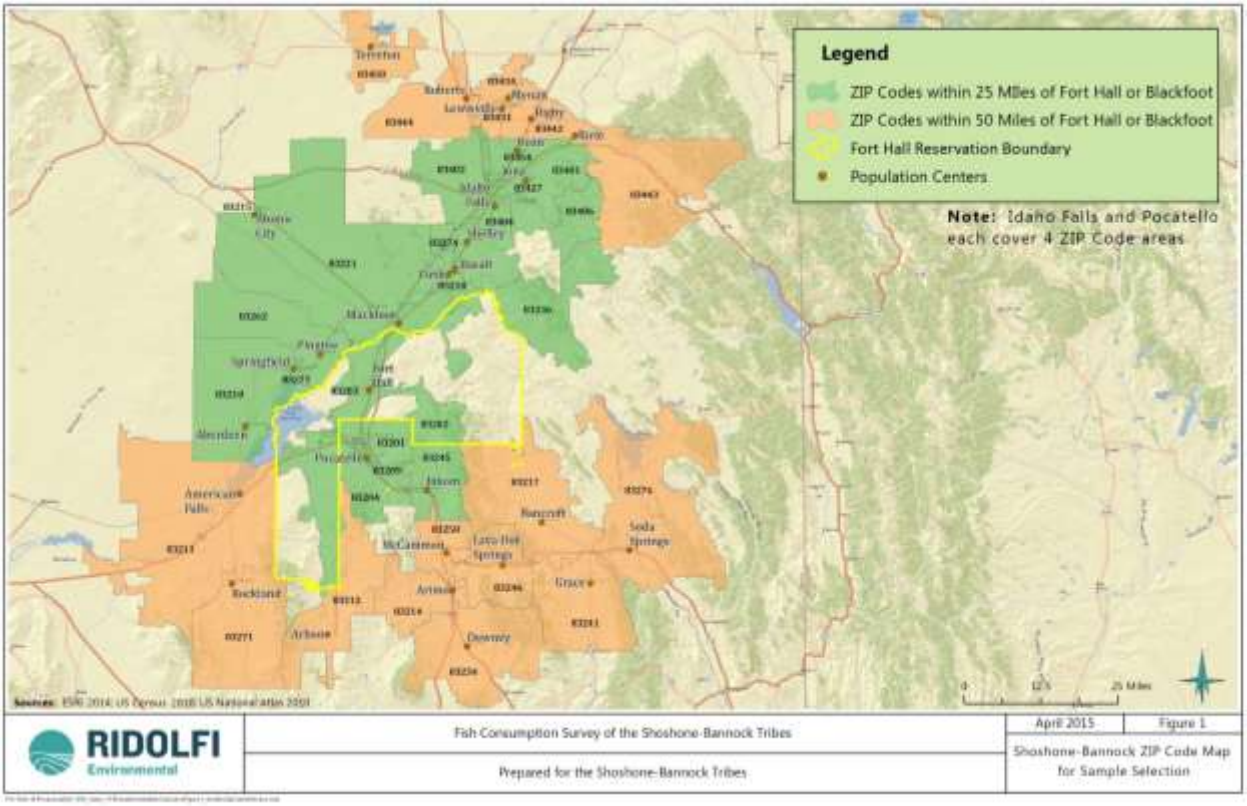


Table F1. Fort Hall Reservation ZIP codes, corresponding population centers, and distances to sampling hubs for the Shoshone-Bannock Tribes survey.

ZIP Code	Population Center	Distance to Fort Hall (Miles)	Distance to Blackfoot (Miles)	Buffer Distance	Closest Sampling Hub
83201	Pocatello	11.2	22.6	25	Fort Hall
83202	Pocatello	11.2	22.6	25	Fort Hall
83203	Fort Hall	0.0	11.9	25	Fort Hall
83204	Pocatello	11.2	22.6	25	Fort Hall
83209	Pocatello	11.2	22.6	25	Fort Hall
83210	Aberdeen	21.1	30.2	25	Fort Hall
83211	American Falls	27.1	38.0	50	Fort Hall
83212	Arbon	40.4	52.0	50	Fort Hall
83214	Arimo	35.4	44.4	50	Fort Hall
83215	Atomic City	34.1	29.4	50	Blackfoot
83217	Bancroft	35.5	39.9	50	Fort Hall
83218	Basalt	24.0	12.5	25	Blackfoot
83221	Blackfoot	11.9	0.0	25	Blackfoot
83234	Downey	44.7	53.8	50	Fort Hall
83236	Firth	22.8	11.4	25	Blackfoot
83241	Grace	47.9	52.6	50	Fort Hall
83245	Inkom	18.9	27.6	25	Fort Hall
83246	Lava Hot Springs	35.9	42.9	50	Fort Hall
83250	McCammon	29.4	38.2	50	Fort Hall
83262	Pingree	9.8	13.8	25	Fort Hall
83271	Rockland	38.7	50.4	50	Fort Hall
83274	Shelley	28.9	17.3	25	Blackfoot
83276	Soda Springs	49.9	52.7	50	Fort Hall
83277	Springfield	12.8	18.7	25	Fort Hall
83401	Idaho Falls	36.3	24.7	25	Blackfoot
83402	Idaho Falls	36.3	24.7	25	Blackfoot
83404	Idaho Falls	36.3	24.7	25	Blackfoot
83406	Idaho Falls	36.3	24.7	25	Blackfoot
83427	Iona	42.6	31.1	50	Blackfoot
83431	Lewisville	50.6	38.7	50	Blackfoot
83434	Menan	52.6	40.7	50	Blackfoot
83442	Rigby	51.4	39.7	50	Blackfoot
83443	Ririe	53.3	41.9	50	Blackfoot
83444	Roberts	50.0	38.2	50	Blackfoot
83450	Terreton	55.8	45.2	50	Blackfoot
83454	Ucon	45.8	34.0	50	Blackfoot

[NPT only]

Appendix G. Survey Design Document, Nez Perce Tribe.

This appendix will be added to a later version of this report.